

2012-1014

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

LIGHTING BALLAST CONTROL LLC,

Plaintiff-Appellee,

v.

PHILIPS ELECTRONICS NORTH AMERICA CORPORATION

Defendant,

and

UNIVERSAL LIGHTING TECHNOLOGIES, INC.,

Defendant-Appellant.

APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF TEXAS IN CASE NO. 09-CV-00029,
JUDGE REED O'CONNOR

NONCONFIDENTIAL JOINT APPENDIX

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JOINT APPENDIX INDEX

DOCUMENT

PAGE NO.

Orders and Judgments on Appeal

Amended Memorandum Opinion and Order,
Dated December 2, 2010, (DKT 107).....A1-A34

Summary Judgment Order, Dated May 4, 2011 (DKT 172) A35-A63

Order Granting in Part and Denying in Part LBC's Emergency
Motion for Reconsideration, Dated May 25, 2011 (DKT 187)..... A64-A71

Memorandum Opinion and Order on Motions for Judgment,
Dated August 26, 2011 (DKT 255) A72-A124

Final Judgment, Filed August 26, 2011 (DKT 256).....A125

Docket Sheet

Civil Docket for N. District of Texas, 7:09-cv-0029-O,
Dated November 26, 2011 A126-A158f

Jury Charge and Verdict

Charge of the Court, Dated June 17, 2011 (DKT 241)..... A159-A185

Patents

U.S. Patent No. 5,436,529, Dated July 25, 1995 A186-A200

Protective Order

Stipulated Protective Order, Dated February 2, 2010 (DKT 65)..... A201-A215

Docket Entries and Trial Exhibits and Transcripts

Plaintiff's Original Complaint and Exhibits thereto,
Dated February 24, 2009 (DKT 1)..... A230-A254

Plaintiff's Opening Brief on Claim Construction and Exhibits
Thereto, Dated May 6, 2010 (DKT 84) A326, 347-48

Defendants Philips Electronics North America Corporation's
and Universal Lighting Technologies, Inc.'s Joint Opening
Brief on Claim Construction, Dated May 6, 2010 (DKT 85),
Excerpts (CONFIDENTIAL MATERIAL)..... A455, 463-64, 468-86

Appendix to Defendants Philips Electronics North America
Corporation's and Universal Lighting Technologies, Inc.'s Joint
Opening Brief on Claim Construction and Exhibits thereto,
Dated May 6, 2010 (DKT 86), *Excerpt*

Exhibit 3 to Exhibit B to Appendix, Excerpts from
Deposition of Andrzej Bobel, Dated April 15, 2010
(**CONFIDENTIAL MATERIAL**) A651, 658-62

Memorandum Opinion and Order, Dated August 19, 2010
(DKT 101)..... A796-A815

Plaintiff's Motion for Reconsideration and Clarification, and
Request for Expediting Hearing, Dated August 30, 2010
(DKT 102), *Excerpt*A816, 820

Order Staying All Deadlines Pending Ruling On Motion For
Reconsideration, Dated October 29, 2010 (DKT 106)..... A859-60

Brief in Support of Defendant Universal Lighting
Technologies, Inc.'s Motion for Summary Judgment or Partial
Summary Judgment and Appendix Thereto,
Dated February 25, 2011 (DKT 127), *Excerpts*
(**CONFIDENTIAL MATERIAL**).....A942-43, 984-87, 994-99

Exhibit A, Declaration of Robert V. Burke in Support of
Motion for Summary Judgment or Partial Summary
Judgment, Dated February 25, 2011 (**CONFIDENTIAL**
MATERIAL) A1006-09

Exhibit C4, Expert Report of Dr. Victor R. Roberts
Regarding Infringement, Dated January 24, 2011,
Excerpts (CONFIDENTIAL MATERIAL) A1173, 1194-95

Exhibit C5, Rebuttal Expert Report of Robert Burke,
Dated February 7, 2011, *Excerpts*
(**CONFIDENTIAL MATERIAL**)A1238, 1258

Exhibit C6, Expert Report of Michael Giesselmann on the Invalidity of U.S. Patent No. 5,436,529 and Appendix thereto, Dated February 7, 2011, <i>Excerpts</i> (CONFIDENTIAL MATERIAL)	A1386, 1421-22, 1442-47
Exhibit C9, Deposition of Victor Roberts, Dated February 18, 2011, <i>Excerpts</i> (CONFIDENTIAL MATERIAL)	A1567, 1618-31
Exhibit C12, Certified Translation of Japanese Patent 1-157099, Dated June 20, 1991 (CONFIDENTIAL MATERIAL)	A1719-38
Plaintiff's Response to Motion for Summary Judgment and Memorandum in Support Thereof, Dated March 11, 2011 (DKT 135), <i>Excerpts</i> (CONFIDENTIAL MATERIAL)....	A2853-54, 2879-81, 2889-91, 2906
Plaintiff's Reply in Support of its Motion for Leave to File Sur-Reply in Further Support of its Opposition to Defendant's Motion for Summary Judgment, Dated March 30, 2011 (DKT 145), <i>Excerpt</i>	A4411-14
Agreed Charge, Dated May 3, 2011 (DKT 171), <i>Excerpt</i>	A4848, 4855-56
Motion for Clarification or Reconsideration in Part of the Summary Judgment Order and Request for Expedited Treatment, Dated May 9, 2011 (DKT 176), <i>Excerpt</i>	A4929-A4931
ULT's Opposition to LBC's Emergency Motion for Reconsideration and Clarification of Summary Judgment Order and Exhibits Thereto, Dated May 11, 2011 (DKT 179), <i>Excerpt</i> (CONFIDENTIAL MATERIAL).....	A4950-51, 4970-73
Exhibit 2 to Declaration of Steven J. Routh, Lighting Ballast Control LLC's Objections and Responses To Universal Lighting Technologies, Inc.'s First Set of Interrogatories (Nos. 1-7), Dated February 19, 2010, <i>Excerpts</i> (CONFIDENTIAL MATERIAL)	A4986, 4995-5001

Plaintiff's Response to Defendant's Emergency Motion for Clarification or Reconsideration [ECF. 177], Dated May 18, 2011 (DKT 184).....	A5094-98, 5101-02
Agreed Jury Charge, Dated June 6, 2011 (DKT 203), <i>Excerpts</i>	A5195, 5202, 5204-06, 5234
Plaintiff's Trial Brief on Issue of "Connected To" Language, Dated June 16, 2011 (DKT 232), <i>Excerpt</i>	A5529-30, 5537-38
Charge of the Court, Dated June 17, 2011 (DKT 241), <i>Excerpts</i>	A5627, 5635, 5651-54
Plaintiff's Motion for Entry of Judgment and Memorandum in Support Thereof, Dated June 27, 2011 (DKT 244), <i>Excerpts</i>	A5655, 5664-72
Brief in Support of Universal Lighting Technologies, Inc.'s Motion for Judgment as a Matter of Law, Dated June 27, 2011 (DKT 246), <i>Excerpts</i> (CONFIDENTIAL MATERIAL).....	A5842-73
Plaintiff's Response to Defendant's Motion for Judgment as a Matter of Law, Dated July 18, 2011 (DKT 247), <i>Excerpts</i> (CONFIDENTIAL MATERIAL).....	A6567-68, 6576-77, 6583-85
Plaintiff's Reply in Support of its Motion for Judgment, Dated August 1, 2011 (DKT 250), <i>Excerpts</i>	A7314-16, 7318-23
Reply Brief in Support of Universal Lighting Technologies, Inc.'s Motion for Judgment as Matter of Law and Appendix Thereto, Dated August 1, 2011 (DKT 252)	
Exhibit 4, Plaintiff's Preliminary Proposed Claim Construction Statement, Dated February 5, 2010, <i>Excerpts</i> (CONFIDENTIAL MATERIAL)	A7472
Notice of Appeal, Dated September 12, 2011 (DKT 258).....	A7516-A7519
JTX 2: File history relating to U.S. Patent No. 5,436,529, <i>Excerpts</i>	A8039, 8131-33, 8144-48, 8151
JTX 4: Exclusive License Agreement between Andrzej Bobel and Acacia Patent Acquisition LLC, Dated August 8, 2008 (CONFIDENTIAL MATERIAL).....	A8214-A8226

JTX 5: Bobel - Acacia Agreement Signature Page, Dated April 7, 2008 (CONFIDENTIAL MATERIAL).....	A8227-A8228
JTX 6: Acacia Press Release, Dated September 22, 2008.....	A8229-A8230
JTX 7: Certificate of Incorporation of Lighting Ballast Control LLC, Dated September 24, 2008	A8231-A8235
JTX 8: Assignment and Assumption Agreement between Acacia Patent Acquisition LLC and LBC, Dated October 22, 2008 (CONFIDENTIAL MATERIAL).....	A8236-A8238
JTX 09: Robertson Product Information – Lamp End of Life Circuit Protection	A8239-A8240
JTX 10: Robertson Documents: Robertson marking literature	A8241-A8243
JTX 18: Letter from Robertson to Andrzej Bobel, Dated March 5, 1999 (CONFIDENTIAL MATERIAL).....	A8288-A8289
JTX 19: Termination of Robertson License by Andrzej Bobel, Dated November 21, 2008	A8290-A8291
JTX 46: Letter from Andrew Bobel to GE, Dated December 30, 2005.....	A8479-A8482
JTX 51: Letter from Thomas Tolpin to Patrick Sullivan, Dated September 14, 2005	A8527-A8529
JTX 52: Letter from Mark Patterson to Thomas Tolpin, Dated October 7, 2005	A8530-A8532
JTX 53: Letter from Thomas Tolpin to Mark Patterson, Dated October 20, 2005	A8533-A8543
JTX 60: Email from Mark Paterson to Andrew Bobel, Dated October 5, 2006	A8561-A8563
JTX 71: United States Patent No. 7,015,652 B2, <i>Excerpt</i>	A8691, 8714
JTX 76: List of Accused ULT Products	A8766-A8767
JTX 81: Technical documents: Linear 3 Representative Product (CONFIDENTIAL MATERIAL).....	A8843-A8850

JTX 182: National Electrical Manufacturers Association, “Compatibility of Fluorescent Lamps and Electronic Ballasts in Frequently Switched Applications,” Dated August 18, 2003, <i>Excerpts</i>	A10922, 10926-27
JTX 188: Certified Copy of U.S. Patent No. 4,710,682	A10936-A10945
JTX 223: Document entitled Valdarno Trip Report (ULT044578) (CONFIDENTIAL MATERIAL)	A11016-A11017
DTX 129: Japanese patent application publication No. JP 61- 153997, Filed December 27, 1984	A11262-A11267
DTX 130: Certified English Translation of Japanese patent application publication No. JP 61-153997, Filed December 27, 1984	A11268-A11277
DTX 328: Proposed Rules, Fed. Reg., Vol. 76, No. 69, Dated April 11, 2011, <i>Excerpt</i>	A11316, 11334
PTX 001: Andrew Bobel’s 1992 – 1993 Engineering Notebook, <i>Excerpts</i> (CONFIDENTIAL MATERIAL)	A11580, 11602, 11605, 11607
PTX 003: 1996-1997 Bryce Hesterman Laboratory Notebook, <i>Excerpts</i> (CONFIDENTIAL MATERIAL)	A11658, 11665
PTX019: NEMA LSD 21V1999 (R2002) American National Standards Specifications entitled ANSIVIEC C78.81V2005, <i>Excerpt</i>	A11707, 11710
PTX 58: Linear 1 Colored Schematic	A11720-A11721
PTX 61: Linear 2 Colored Schematic	A11722-A11723
PTX 66: Linear Group 4 Colored Chart	A11724-A11725
PTX 78: Colored chart for ES Group	A11730-A11731
Trial Transcript, Volume B, Dated June 13, 2011, <i>Excerpts</i>	A11916, 11977-12014

Trial Transcript, Volume C, Dated June 13, 2011, <i>Excerpts</i>	A12019, 12024-40, 12052-97
Trial Transcript, Volume A, Dated June 14, 2011, <i>Excerpts</i>	A12117, 12126-97
Trial Transcript, Volume B, Dated June 14, 2011, <i>Excerpts</i>	A12199, 12215-79
Trial Transcript, Volume C, Dated June 14, 2011, <i>Excerpts</i>	A12288, 12306-12404
Trial Transcript, Volume D, Dated June 14, 2011, <i>Excerpts</i>	A12414, 12418-12507
Trial Transcript, Volume A, Dated June 15, 2011, <i>Excerpts</i>	A12557, 12610-12
Trial Transcript, Volume B, Dated June 15, 2011, <i>Excerpts</i>	A12672, 12717-29
Trial Transcript, Volume C, Dated June 15, 2011, <i>Excerpts</i>	A12737, 12743-12841
Trial Transcript, Volume D, Dated June 15, 2011, <i>Excerpts</i>	A12843, 12847-12994
Trial Transcript, Volume A, Dated June 16, 2011, <i>Excerpts</i>	A12997, 13010-13101
Trial Transcript, Volume B, Dated June 16, 2011, <i>Excerpts</i>	A13108, 13129-61
Trial Transcript, Volume C, Dated June 16, 2011, <i>Excerpts</i>	A13166, 13186-13230
Trial Transcript, Volume D, Dated June 16, 2011, <i>Excerpts</i>	A13238, 13245-13374
Trial Transcript, Volume E, Dated June 16, 2011	A13375-A13418
Agreed Jury Charge, Dated April 29, 2011 (DKT 164)	A13600, 13607

REDACTED CONFIDENTIAL MATERIAL

The following documents were designated as containing confidential information pursuant to the Protective Order entered in Lighting Ballast Control, LLC v. Philips Electronics North America Corp, et al., No. 7:09-cv-290, before the United States District Court for the Northern District of Texas. (See A201 – A215) Pursuant to the Protective Order, these documents are precluded from public disclosure.

A463-486
A651-662
A943-999
A1006-1009
A1173-1195
A1238-1258
A1386-1447
A1567-1631
A1719-1738
A2854-2906
A4951-4973
A4986-5001
A5842-5873
A6568-6585
A7472
A8215-8226
A8228
A8237-8238
A8289
A8844-8850
A11017
A11602-11607
A11665

electronic ballast. A ballast is a device for starting and regulating florescent and other types of lamps. A ballast provides proper voltage to light the lamp, and regulates the electric current flowing through the lamp to control light output. The ballasts at issue in this case are designed to power florescent lamps with heatable filaments. The parties dispute various claim terms in the 529 Patent. The Court has construed the disputed claim terms after reviewing the briefs and responses of the parties, the applicable law, and where appropriate, any extrinsic evidence submitted by the parties.

I. BACKGROUND

The Court sets forth only those facts necessary to provide context for the claim construction. Plaintiff LBC holds the exclusive right to enforce the 529 Patent. The inventor is Andrzej “Andrew” Bobel. The 529 Patent covers a lighting ballast that powers florescent lamps with heatable filaments. An electronic ballast practicing the 529 Patent operates in three different stages: (1) the initial start-up of the ballast, (2) the shut-down or sleep-mode of the ballast, and (3) the re-starting of the ballast after an inoperable lamp has been replaced. Pl.’s Opening Br. Cl. Const. 4, ECF No. 84. The invention was intended to address significant technical challenges facing the ballast industry in 1993; specifically, how to preserve the integrity of the ballast by not drawing power from a power line source when a lamp is removed or defective, and by not having to turn the power OFF and ON when the lamp is replaced. *Id.* at 6. The invention covered by the 529 Patent was intended to remedy these issues in a safe, energy efficient, and affordable manner. *Id.*

LBC sues Defendant Universal Lighting Technologies, Inc. (“ULT”) claiming infringement of the 529 Patent because ULT manufactures, uses, or sells electronic ballasts utilizing circuitry that monitors the voltage across one or more lamps and provides end-of-life protection for multiple types

of failures.¹ Pl.'s Orig. Compl. 4, ECF No. 1. LBC specifically points to the ULT B254PUNV-D ballast as infringing on one or more claims of the 529 Patent. *Id.* ULT denies any infringement and brings a counterclaim seeking a declaration that ULT has not infringed any of the claims of the 529 Patent, and that the patent is invalid. Def.'s Am. Answer 7, ECF No. 70.

II. LEGAL STANDARDS - PATENT CLAIM CONSTRUCTION

Patent infringement is the unauthorized making, using, selling, offering to sell, or importing into the United States of any patented invention during the term of the patent. 35 U.S.C. § 271(a). In a patent infringement case, a court first determines the proper construction of the patent claims by establishing, as a matter of law, the scope and boundaries of the subject-matter of the patent. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370, 384-85 (1996). Second, the trier of fact compares the properly construed claims to the allegedly infringing device(s) and determines whether there has been an infringement. *Id.* The issue before the Court is the proper construction of certain disputed claims in the 529 Patent.

A. Rules of Claim Construction

The claims of a patent are the numbered paragraphs at the end of the patent that define the scope of the invention, and thus the scope of the patentee's right to exclude others from making, using, or selling the patented invention. *See Astrazeneca AB v. Mutual Pharm. Co.*, 384 F.3d 1333, 1335-36 (Fed. Cir. 2004). Claim construction is the process of giving proper meanings to the claim language thereby defining the scope of the protection. *See Bell Commc'ns Research, Inc. v. Vitalink Commc'ns Corp.*, 55 F.3d 615, 619 (Fed. Cir. 1995) (internal citations omitted).

¹ LBC originally sued several defendants, however, ULT is the only remaining defendant in the case, pending final settlement with Philips Electronics North America Corp.

Claim construction starts with the language of the claim itself since a patent's claims define the invention to which the patentee is entitled the right to exclude. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). "The claims themselves provide substantial guidance as to the meaning of particular claim terms." *Id.* at 1314. Moreover, claim terms should be given their ordinary and customary meaning as understood by a person of ordinary skill in the art as of the effective filing date of the patent application. *Id.* at 1313. This is because a patent is addressed to, and intended to be read by, others skilled in the particular art. *Id.* However, the patentee is free to define his own terms, so long as any special definition given to a term is clearly defined in the specification. *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1388 (Fed. Cir. 1992).

When construing disputed claim terms the court should look first to the intrinsic record of the patent, including the claims and the specification, to determine the meaning of words in the claims. *Nazomi Commc'ns., Inc. v. Arm Holdings, PLC*, 403 F.3d 1346, 1368 (Fed. Cir. 2005). "The specification is always highly relevant to the claim construction analysis. Usually it is dispositive; it is the single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1315. The specification acts as a dictionary when it expressly or implicitly defines terms. *Id.* at 1321. Courts should also refer to the prosecution history if it is in evidence. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). The prosecution history is part of the intrinsic record and consists of a complete record of all proceedings before the United States Patent and Trademark Office, including prior art cited during the examination of the patent, and express representations made by the applicant as to the scope of the claims. *Id.*

The Federal Circuit has also stated that district courts may "rely on extrinsic evidence, which consists of all evidence external to the patent and prosecution history, including expert and inventor

testimony, dictionaries, and learned treatises.” *Id.* (internal quotations omitted). Dictionaries and treatises can be “useful in claim construction[,]” particularly technical dictionaries which may help the court “to better understand the underlying technology and the way in which one of skill in the art might use the claim terms.” *Id.* at 1318 (internal quotations omitted). As to expert testimony, the Federal Circuit has stated:

[E]xtrinsic evidence in the form of expert testimony can be useful to a court for a variety of purposes, such as to provide background on the technology at issue, to explain how an invention works, to ensure that the court’s understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field.

Id. However, “a court should discount any expert testimony that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent.” *Id.* (internal quotations omitted). Extrinsic evidence is less significant than the intrinsic record and undue reliance on it may pose a risk of changing the meaning of claims, contrary to the public record contained in the written patent. *Id.* 1317, 1319.

B. Means-Plus-Function Limitations

Pursuant to 35 U.S.C. § 112 ¶ 6 a patentee may express a claim limitation by reciting a function to be performed by a generic means, rather than reciting in the claim the actual structure for performing the particular function. Section 112, ¶ 6 provides:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Section 112, ¶ 6 thus “operates to restrict claim limitations drafted in such functional language to those structures, materials, or acts disclosed in the specification (and their equivalents) that perform the claimed function.” *Personalized Media Comm’ns, LLC v. Int’l Trade Comm’n*, 161 F.3d 696, 703 (Fed. Cir. 1999). “The point of the requirement that the patentee disclose particular structure in the specification and that the scope of the patent claims be limited to that structure and its equivalents is to avoid pure functional claiming.” *Aristocrat Techs. Australia Pty Ltd. v. Int’l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008).

The determination of whether a particular limitation should be regarded as a means-plus-function limitation is a question of law, even though it is a question on which evidence from experts may be relevant. *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1358 (Fed. Cir. 2004) (citations omitted). The *Lighting World* court set forth the standard to be used when determining whether to apply section 112, ¶ 6 to a claim limitation:

A claim limitation that actually uses the word “means” invokes a rebuttable presumption that § 112, ¶ 6 applies. By contrast, a claim term that does not use “means” will trigger the rebuttable presumption that § 112, ¶ 6 does not apply. The use of the term “means” is central to the analysis because the term “means,” particularly as used in the phrase “means for,” is part of the classic template for functional claim elements and has come to be closely associated with means-plus-function claiming.

Id. at 1358. However, claim language that further defines a generic term, such as nouns or adjectival qualifications that appear before or after the word “means,” can add or suggest sufficient structure to avoid section 112, ¶ 6. *Mass. Inst. of Tech. v. Abacus Software*, 462 F.3d 1344, 1354 (Fed. Cir. 2006). Moreover, section 112, ¶ 6 may be avoided where “the claim term is used in common parlance or by persons of skill in the pertinent art to designate structure, even if the term covers a broad class of structures and even if the terms identify the structures by their function.” *Id.* at 1356

(quotations and citations omitted).

Claim construction of a means-plus-function limitation has two steps: “First, the court must determine the claimed function. Second, the court must identify the corresponding structure in the written description of the patent that performs that function.” *Applied Med. Res. Corp. v. U.S. Surgical Corp.*, 448 F.3d 1324, 1332 (Fed. Cir. 2006). The claimed function is recited in the claim itself, and the corresponding structure “must not only perform the claimed function [but] the specification must clearly associate the structure with the performance of the function.” *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 296 F.3d 1106, 1113 (Fed. Cir. 2002). The court should first inquire as to whether “structure is described in [the] specification, and, if so, whether one skilled in the art would identify the structure from that description.” *Atmel Corp. v. Info. Storage Devices, Inc.*, 198 F.3d 1374, 1381 (Fed. Cir. 1999). “The inquiry is whether one of skill in the art would understand the specification itself to disclose a structure, not simply whether that person would be capable of implementing a structure.” *Biomedino, LLC v. Waters Techs. Corp.*, 490 F.3d 946, 953 (Fed. Cir. 2007).

III. ANALYSIS

The parties have presented two claims from the 529 Patent for construction. Claim 1 recites (with the disputed claim limitations emphasized in bold):

1. An energy conversion device employing an **oscillating resonant converter** producing oscillations, having **DC input terminals producing a control signal** and adapted to power at least one gas discharge lamp having heatable filaments, the device comprising:

voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals;

output terminals connected to the filaments of the gas discharge lamp;

control means capable of receiving control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and a direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective.

Pl.'s Opening App. 14, ECF No. 84-1.

Claim 18 recites (again with the disputed claim limitations emphasized in bold):

18. An energy conversion device employing an **oscillating resonant converter**, having **DC input terminals** and adapted for powering at least one gas discharge lamp having heatable filaments, the device comprising:

voltage source means able to provide a constant or variable magnitude DC voltage between the DC input terminals;

output terminals for connection to the filaments of the gas discharge lamp;

control means able to receive control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and

direct current blocking means coupled to output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective wherein the direct current blocking means includes a semiconductor diode and is connected effectively across at least one heatable filament of at least one gas discharge lamp.

Pl.'s Opening App. 15, ECF No. 84-1. Independent Claims 1 and 18 are nearly identical, with Claim 18 adding one additional limitation relating to a diode. Pl.'s Opening Br. 14. The parties dispute the construction of three alleged means-plus-function limitations, and four other terms. *Id.* The Court

will turn to the disputed terms and limitations, most of which appear in both Claims 1 and 18.

The parties dispute several terms that initially appear in the preambles and further dispute whether the use of these terms in the preambles should serve as a substantive limitation where those terms appear elsewhere in the claims. Plaintiff LBC concedes that the disputed terms appearing in the preambles provide the antecedent basis for those terms where they appear elsewhere in the claims. Thus, the Court's construction of the preamble terms will necessarily limit the terms for which the preamble provides the antecedent basis. Therefore, the Court need not go further in determining whether the preambles constitute substantive limitations of the claims.

A. “Oscillating Resonant Converter”

The term “oscillating resonant converter” appears in the preambles to Claims 1 and 18. The parties agree that the oscillating resonant converter can convert DC to AC and “includes inductance and capacitance; they also agree that the AC voltage created by the resonant converter is of a frequency close to the resonant frequency determined by the inductive and capacitive elements.” Pl.’s Opening Br. 21. However, they disagree as to whether the term includes both self-excited and driven resonant converters.

1. Plaintiff’s Proposed Construction

Plaintiff LBC argues that “oscillating resonant converter producing oscillations” need not be construed, but in the event that it is proposes a construction as follows: “a circuit, or portion of a circuit, containing inductance, capacitance, and at least one electronic switching device (such as a transistor) that operates to convert direct current into alternating current.” *Id.* LBC notes that this term occurs only in the preambles, and while not conceding “that the Preamble constitutes a substantive limitation, because it does not ‘breath life’ into the claim[,]” LBC agrees that “oscillating

resonant converter” as “recited in the Preamble serves as the antecedent basis for the ‘resonant converter’ recited elsewhere in Claims 1, 2, and 18.” *Id.* LBC’s proposed construction is consistent with its contention that the term “oscillating resonant converter” is not limited to self-excited resonant converters.

2. *Defendant’s Proposed Construction*

Defendant ULT proposes to construe “oscillating resonant converter” as follows: “a self-excited electronic circuit capable of converting a DC voltage to an AC voltage of a resonant frequency determined by a combination of inductive and capacitive elements within the self-excited circuit.” Defs.’ Opening Br. Cl. Const. 11, ECF No. 85. At the heart of ULT’s proposed construction is their argument that the term should be limited to self-exciting oscillating resonant converters. *See id.* Since the term is the antecedent reference to “resonant converter” in the claim limitations, the claims would be limited to self-exciting oscillating resonant converters.

3. *Court’s Analysis and Construction*

Plaintiff LBC urges the Court to reject ULT’s proposed construction because the self-excited electronic circuit limitation, upon which their construction is based, is not supported by either the claim language or specification of the 529 Patent. *See Pl.’s Opening Br.* 21-22. However, ULT argues that the claim language “oscillating resonant converter producing oscillations” necessarily limits the structure to self-excited oscillating resonant converters. Defs.’ Opening Br. 11. ULT’s proposed construction is premised on this contention. *See id.* at 11-13; Defs.’ Resp. Br. 12-14.

ULT’s proposed construction, limiting “oscillating resonant converter” to self-excited oscillating resonant converter, confuses two distinct structures—a resonant circuit and a resonant converter. *See App. Supp. Pl.’s Resp. Br. Cl. Const.* 21, ECF No. 88. In a resonant circuit, “AC

energy is rhythmically transferred, or oscillates, between an inductor and capacitor,” whereas a resonant converter is “composed of a resonant circuit working in combination with an energy converter.” *Id.* at 21-22. In a lamp ballast, “the energy converter converts DC power into high frequency AC power . . . [which then] flows from the energy converter through all or part of the resonant circuit and ultimately powers the lamp.” *Id.* at 22. Thus, “[w]hile all resonant circuits oscillate naturally until their stored energy has been dissipated, the energy converter portion of a resonant converter must be driven by a high frequency signal.” *Id.* In a self-oscillating resonant converter this “drive signal” comes from the resonant circuit itself, whereas in a so-called “driven resonant converter,” the drive signal comes from a “driver” circuit rather than the resonant circuit. *See id.* Therefore, in a true self-excited, or self-oscillating, resonant converter the component energy converter is driven by the other component of the converter, the resonant circuit; but in a driven resonant converter, the energy converter is driven by a separate device. Accordingly, both driven resonant converters and self-excited oscillating resonant converters fall within the ambit of the term “oscillating resonant converter,” because both include, as a component, a resonant circuit which produces oscillations by nature.

ULT’s proposed construction seeks to exclude driven resonant converters from the term “oscillating resonant converter.” To do so, ULT argues that an “oscillating resonant converter producing oscillations” describes only a self-excited oscillating resonant converter. The Court believes that this construction is unduly narrow. As set forth above, no such limitation is implicit or explicit within the claim language as understood by one of ordinary skill in the art. Moreover, the specification explicitly contemplates the use of other non-self-excited resonant converters. *See* 529 Patent at col. 11, ll. 34-39. Thus, ULT’s proposed limitation is not apparent from the language of

the claims, the specification, or the knowledge of one of ordinary skill in the art of designing lighting ballasts. It rests on an unduly narrow interpretation of "oscillating resonant converter" that obscures the fact that both self-exciting and driven resonant converters include a resonant circuit producing oscillations. All of ULT's remaining arguments in support of its proposed construction are based on this premise and occasional imprecise usages of the term in deposition testimony. The Court need not further address the issue.

B. "DC Input Terminals"

This term appears initially in the preambles to Claims 1 and 18 and again appears in three out of the four limitations in each claim. While the parties' dispute revolves around whether the DC input terminals are appropriately understood as conducting elements or points on a schematic, neither party proposes a construction radically different from the other.

1. Plaintiff's Proposed Construction

Plaintiff does not believe that any construction is necessary, but in the event the term is construed LBC suggests "the points at which the ballast receives a direct current voltage." See Pl.'s Opening Br. 22.

2. Defendant's Proposed Construction

ULT proposes that "DC input terminals" be defined as "conducting elements that receive a DC input voltage." Defs.' Opening Br. 13.

3. Court's Analysis and Construction

The specification of the 529 Patent at column 3, lines 5-6 speaks directly to the issue of the proper construction of this term: "DC input terminals B+,B- for receiving thereacross a DC supply voltage[.]" This statement unambiguously defines "DC input terminals." See *Interactive Gift*

Express, Inc. v. Compuserve, Inc., 256 F.3d 1323, 1332 (Fed. Cir. 2001) (“If the meaning of the claim limitations is apparent from the totality of the intrinsic evidence, then the claim has been construed.”).

Plaintiff LBC prefers to define the “DC input terminals” as mere points on a schematic, whereas Defendant ULT proposes to define them as conducting elements. It is clear that neither party’s proposed constructions are inherently inconsistent with one another; defining the “DC input terminals” as conducting elements is not inconsistent with their being labeled as points on a schematic diagram and *vice-versa*. Moreover, the Court finds that neither proposed construction further clarifies the term beyond the extent to which it is already defined in the specification. Accordingly, the term “DC input terminals” need not be construed beyond the definition provided by the specification: terminals “for receiving . . . a DC supply voltage[.]”

C. “DC input terminals producing a control signal”

Plaintiff LBC acknowledges that this term appears only in the preamble to Claim 1. LBC also concedes that the term “provides the antecedent basis for the ‘control signal[] from the DC input terminals’ referenced in the ‘control means’ limitations” of Claims 1 and 18. Pl.’s Opening Br. 23. The parties’ dispute revolves around whether the “DC input terminals” produce “a control signal.”

1. Plaintiff’s Proposed Construction

Plaintiff LBC does not believe that any construction of this term is necessary, but in the event it is construed proposes as follows: “DC input terminals” are “the points at which the ballast receives a direct current voltage,” “producing” means “serving as the origin of,” and “control signal [from the DC input terminals]” means “direct current that travels along a direct current path from the DC input terminals, through the filament or filaments, and to an input terminal of the control means, but

which does not pass through the DC blocking means." Pl.'s Opening Br. 23.

2. *Defendant's Proposed Construction*

Like LBC, Defendant ULT reargues its proposed construction of "DC input terminals." With respect to "producing a control signal," ULT argues the limitation fails to comply with section 112, ¶¶ 1 and 2. Therefore, according to ULT, Claims 1 and 18 are invalid in that "DC input terminals" are not capable of producing any type of "control signal." *See* Defs.' Opening Br. 14.

3. *Court's Analysis and Construction*

The specification of the 529 Patent at column 7, lines 48-54, provides that "The device receives a DC voltage at the DC input terminals B+,B- and the capacitors 04,06 are charged DC current starts to flow in the direct current path DCP from terminal B+ through: resistor 09, filament 12, resistor 18, filament 15, diode 39, resistor 40 to charge the capacitor 42[.]" Moreover, Figure 1 of the 529 Patent indicates that the DCP begins at the DC input terminals B+,B- and flows along a dotted line through various structures and filaments to terminal CTa. However, the specification never refers to the DC voltage flowing along the DCP as a "control signal."

ULT seizes upon the fact that the claims "unambiguously require[] that the 'control signal' be *produced by* the 'DC input terminals,' not by other circuit elements." Defs.' Resp. Br. 14. Their argument proceeds as follows: the "DC input terminals," whether they are construed as points at which the ballast receives a direct current voltage or as conducting elements that receive a DC input voltage, are incapable of "producing" a control signal. *See* Defs.' Opening Br. 15. According to ULT:

It is only after the current flowing along the path DCP has passed through the lamp filaments (12,15) and resistors (09, 18) that a control signal results at intermediate terminal (27) to signal the control circuit that non-defective lamp is properly connected to the

“output terminals” of the energy conversion device. This control signal appears on the intermediate terminal (27) and the control terminal (CTa) downstream of the lamp filaments, not at the DC input terminals. If a connection were made along the path DCP at a point upstream of the lamp filaments, the resulting signal would be present whether or not [a] non-defective lamp is connected, and the device would be completely inoperative for the purpose for which it is intended.

Id. One basic assumption underlies this argument: the word “produce” means something more than originate, or point of origin.

The clear language of the specification of the 529 Patent at column 7, lines 51-56, column 8, lines 13-17, 37-40, 47-50, teaches that when a lamp is removed or is defective the DC voltage will not flow through the filaments and thus will not reach the intermediate terminal (27). Moreover, ULT never defines what it means by “producing a control signal;” it assumes that since the “DC input terminals” are merely points or conducting elements they cannot produce a “control signal.” LBC counters that the term “produce” is interchangeable with “originate” and directs the Court to the 529 Patent’s specification and Figure 1 describing the path of the DC current. *See* Pl.’s Opening Br. 24; Webster’s Third New Int’l Dictionary 1810 (1993). The specification and Figure 1 clearly indicate, as LBC argues, that “B+ and B- . . . indicate the points (or terminals or nodes) at which DC enters the ballast and as a point of reference from which the DC control signal flows.” *Id.* While the drafter was perhaps imprecise by referring to a control signal in the claims without clarifying that the control signal was in fact the DC current referred to elsewhere, it is clear from the specification and Figure 1 that the control signal produced by, or originating at, the DC input terminals is the DC voltage running from B+ through the various resistors and filaments to the control terminal (CTa). Therefore, “DC input terminals” means terminals for receiving a DC supply voltage, “producing” means serving as the origin of, and “control signal” means DC that travels along a direct current path

from the DC input terminals, through the filament or filaments, and to an input terminal of the controls means, but which does not pass through the DC blocking means.

D. Reconsideration of “Voltage Source Means” Limitation

The parties dispute whether the limitation “voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals” is a means-plus-function limitation, subject to construction as limited by section 112, ¶ 6. LBC argues that “voltage source” connotes sufficient structure to one skilled in the art and that it should avoid treatment as a means-plus-function limitation. In the alternative, LBC argues that if the Court determines that section 112, ¶ 6 applies, then the specification discloses the corresponding structure. ULT argues that the term should be treated as a means-plus-function limitation because it is written in means-plus-function format, and furthermore, that the specification does not disclose a corresponding structure, making both claims in which the limitation appears indefinite.

1. Plaintiff’s Proposed Construction

LBC argues that this limitation, while using the term “means,” is not a means-plus-function limitation because the entire limitation “connotes sufficient structure to one skilled in the art” and has an understood meaning in the art when read in the context of the specification. *See* Pl.’s Opening Br. 14-15. Specifically, according to LBC, “voltage source means [providing (claim 1), able to provide (claim 18)] a constant or variable magnitude DC voltage between the DC input terminals” connotes the structure of a rectifier to anyone skilled in the art. *Id.* at 15. As support for this assertion LBC points to testimony from Andrew Bobel, the inventor, who has several years of experience working on electronic ballast designs, and Dr. Victor Roberts, an expert witness. *Id.* Both Bobel and Dr. Roberts testify, that as persons skilled in the art, the “voltage source means” limitation clearly

connotes the structure of a rectifier. Pl.'s Opening App. Ex. 2-A at 226, ECF No. 84-3; Ex. 3 at 7-8, ECF No. 84-7. In the alternative, LBC argues that if the Court determines that section 112, ¶ 6 applies, making the limitation a means-plus-function limitation, then the specification discloses the structure of a rectifier. Pl.'s Opening Br. 15-16.

2. *Defendant's Proposed Construction*

ULT argues that this limitation is governed by section 112, ¶ 6 as a means-plus-function limitation. Defs.' Opening Br. 16. First, ULT points to the use of the term "means," which presumptively invokes section 112, ¶ 6. *Id.* Secondly, according to ULT, the limitation itself clearly recites a function only. *Id.* And third, the claim language does not point to any structure. *Id.* Thus, ULT asserts, this limitation is a classic means-plus-function limitation and must be construed according to section 112, ¶ 6. ULT then goes on to argue that the specification does not disclose any structure, a rectifier or otherwise, for performing the claimed function. *Id.* 18-20. Accordingly, ULT urges that Claims 1 and 18 should be held invalid because they are indefinite.

3. *Court's Analysis and Construction*

The Court previously adopted the proposed construction of Defendant ULT. *See* Memorandum Opinion and Order, August, 19, 2010. The Court found that the "voltage source means" limitation was written in the classic means-plus-function format, that it recited only a function, and did not disclose sufficient structure to remove it from the ambit of section 112, ¶ 6. *See id.* at 10-12. The Court, construing the "voltage source means" limitation as a means-plus-function limitation, went on to find that "Lighting Ballast . . . failed to identify a structure in the 529 Patent's specification that corresponds to the 'voltage source means' limitation, contrary to the requirements of 35 U.S.C. § 112, ¶ 6." *Id.* at 17. Accordingly, the Court found both Claims 1 and

18 to be invalid as indefinite under section 112, ¶ 2 because the specification failed to disclose a structure corresponding to the functional limitation. *Id.* at 18-19.

In its Motion for Reconsideration, LBC argues that in so construing the “voltage source means” limitation the Court improperly discounted “the importance of the functional language following ‘means’” and the unchallenged expert testimony in the record from Bobel and Dr. Roberts. *See Pl.’s Mot. Recons. 2-6, ECF No. 102.* In its response, ULT focuses on the standards applicable to a post-judgment motion under Rule 59 of the Federal Rules of Civil Procedure and argues that LBC has not identified any proper basis for the Court to reconsider its ruling that the “voltage source means” limitation is subject to construction under section 112, ¶ 6. *See Def.’s Resp. 1-2, ECF No. 104.* ULT supports the Court’s prior ruling by arguing that the Court expressly considered all the recited claim language, properly considered LBC’s expert testimony, and found that it does not support LBC’s desired outcome. *See id.* at 2-7.

After careful consideration, research, and deliberation the Court finds that in issuing its previous claim construction order it erred in its construction of the “voltage source means” limitation. The Court’s prior ruling unduly discounted the unchallenged expert testimony, in light of Federal Circuit precedent on the issue, offered by Bobel and Dr. Roberts regarding the knowledge of one of ordinary skill in the electronic ballast field. Under Rule 54(b) of the Federal Rules of Civil Procedure, the Court may freely review and revise interlocutory orders at any time before the entry of a final judgment adjudicating all claims of all parties before the Court. Therefore, the Court may modify a prior ruling if the arguments of the parties or new evidence persuade the Court to do so for any reason, so long as the Court is not making a legal error or abusing its discretion. *See Matagorda Ventures Inc. v. Travelers Lloyds Ins. Co.*, 208 F. Supp. 2d 687, 688 (S.D. Tex. 2001) (interlocutory

orders of the court are subject to revision on motion or *sua sponte* before entry of final judgment). Moreover, the Federal Circuit has expressly noted the need for district courts to entertain motions to reconsider in the specific context of claim construction. See *Jack Guttman, Inc. v. Kopykake Enters., Inc.*, 302 F.3d 1352, 1361 (Fed. Cir. 2002) (“District courts may engage in a rolling claim construction, in which the court revisits and alters its interpretation of the claim terms as its understanding of the technology evolves. This is particularly true where issues involved are complex, either due to the nature of the technology or because the meaning of the claims is unclear from the intrinsic evidence.”)² see also *Union Oil Co. v. Atl. Richfield Co.*, 1998 WL 34238564 at *2 (C.D. Cal. Mar. 6, 1998) (noting that motion to reconsider is proper vehicle by which to challenge a claim construction order). LBC’s motion for reconsideration is granted, in part, and denied, in part, as explained below.

The parties dispute whether the limitation “voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals” is a means-plus-function limitation, subject to section 112, ¶ 6. The Court begins with the presumption that this is a means-plus-function limitation, subject to construction under section 112, ¶ 6 because it uses the term “means.” See *Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 1361 (Fed. Cir. 2000). Plaintiff LBC, as the party advocating a construction outside of section 112, ¶ 6, has the burden of overcoming the presumption. See *Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1319-20 (Fed. Cir. 2004). This presumption will collapse if the claim describes sufficient structure for performing the recited function, despite its use of the term “means.” See *Apex, Inc. v. Raritan Computer, Inc.*, 325

² Although the Court has revised its construction of the “voltage source means” limitation in response to Plaintiff’s Motion for Reconsideration, the Court does not imply, by this quote, that any further revisions to any of the Court’s claim constructions in this order will be necessary or likely. A settled claim construction order is required for this case to proceed.

F.3d 1364, 1372 (Fed. Cir. 2003); *see also Personalized Media*, 161 F.3d at 704 (In deciding whether the presumption has been rebutted “the focus remains on whether the claim as properly construed recites sufficiently definite structure to avoid the ambit of § 112, ¶ 6.”); *Rodime PLC v. Seagate Tech., Inc.*, 174 F.3d 1294, 1302 (Fed. Cir. 1999) (“[E]ven if the claim element specifies a function, if it also recites sufficient structure . . . for performing that function, § 112, ¶ 6 does not apply.”). In order to avoid means-plus-function construction the “voltage source means” limitation need not denote a specific structure, it is sufficient if the term is used “in common parlance or by persons of skill in the pertinent art to designate structure, *even if the term covers a broad class of structures and even if the term identifies the structures by their function.*” *Lighting World*, 382 F.3d at 1359-60 (emphasis added); *see also Apex*, 325 F.3d at 1372 (“[T]his court inquires into whether the ‘term, as the name for the structure, has a reasonably well understood meaning in the art,’ keeping in mind that a claim term ‘need not call to mind a single well-defined structure’ to fall within the ambit of § 112, ¶ 6.”) In *Comtech EF Data Corp. v. Radyne Corp.*, 2007 U.S. Dist. LEXIS 97038 (D. Ariz. Oct. 12, 2007) *aff’d in relevant part*, 2008 U.S. Dist. LEXIS 26966 (D. Ariz. Mar. 31, 2008), a special master appointed by the district court confronted a similar claim term with a curious and seemingly unnecessary use of “means.”

The term at issue in *Comtech* stated “power supply means for supplying power.” *Id.* at *31. The special master first determined that the drafter’s use of “means” was most likely not intended to invoke section 112, ¶ 6 because it was clear that no corresponding structure was disclosed in the specification. *Id.* at *33. The special master’s report and recommendation went on to explain the drafter’s use of “means” was based on “the highly likely proposition that, in the context of the claimed invention, a person of ordinary skill in the art would recognize that ‘power supply’ connotes

a well understood class of structures[.]” *Id.* at 34. Referencing *Lighting World*,³ the special master held that “power supply means” did not “denote a specific structure, but it is understood by persons of skill in the RF converter system art to designate a broad class of structures that supply power appropriate to the claimed system.” *Id.* at *36. Thus, the “power supply means” term was understood by those of ordinary skill in the industry to describe structure. *See id.* The Court believes this rationale applies equally to the “voltage source means” term in the 529 Patent.⁴

LBC presents the testimony of Dr. Roberts and the inventor, Andrew Bobel, to support its contention that the “voltage source means” limitation connotes the structure of a rectifier to anyone skilled in the art of designing electronic ballasts. According to Dr. Roberts:⁵

The “voltage source” limitation connotes, or suggests, to me, and would connote to anyone skilled in the art, the structure of a rectifier—with its input terminals connected to an AC power line and with its output terminals connected to the DC input terminals. In other words, the only way for a lighting ballast to convert AC (from a “power line source” such as a wall outlet or other similar AC power source in a home or office) into DC (for use as the “DC supply voltage”) is through a rectifier. In the vast majority of applications, including nearly all common applications for residential and commercial uses, the ballast receives its power from an AC power

³ 382 F.3d at 1360 (“What is important is whether the term is one that is understood to describe structure, as opposed to a term that is simply a nonce word or a verbal construct that is not recognized as the name of structure[.]”).

⁴ Defendant ULT continues to urge the Court to accept the approach laid out in *Nilssen v. Motorola, Inc.*, 80 F. Supp. 2d 921, 928 (N.D. Ill. 2000), where the district court found that “source means having AC terminals and being operative to provide an AC voltage thereat” did not recite sufficient structure. As will be explained *infra*, this Court finds the approach of *Comtech* to be in line with Federal Circuit precedent regarding the importance of considering functional language to determine whether sufficient structure is disclosed. Moreover, *Comtech* focuses on the knowledge and understanding of one skilled in the art relative to the language of the claim term as a whole.

⁵ Dr. Roberts has an extensive background in electrical engineering, applied physics, power electronics, lighting ballast design, and various other types of lighting-related technologies. Defendant ULT does not appear to dispute Dr. Roberts’ qualifications or the substance of his opinions, rather ULT questions LBC’s use of his testimony itself. For Dr. Roberts’ qualifications *see* Decl. Victor D. Roberts, Ph.D. Supp. Pl.’s Opening Br. Claim Construction 1-3, ECF No. 84.

source, and that AC power is converted into DC power through the use of a rectifier. A battery could likewise provide the necessary DC supply voltage described in the patent, but in reality, such an arrangement would be used if [sic] very few applications. In either case, one skilled in the art would immediately ascertain and implement the structure necessary to supply the DC supply voltage, based on the particular application of the ballast in question. Stated otherwise, the “voltage source” limitation, when read in the context of the specification and claims, suggests to me a sufficient structure, or class of structures, namely: a rectifier (if converting AC from a “power line source” to DC for a “DC supply voltage”) or, in a very few specialized applications, a battery (if providing the DC supply voltage directly to the DC input terminals).

Decl. Victor D. Roberts, Ph.D. Supp. Pl.’s Opening Br. Claim Construction 7-8, ECF No. 84.

Additionally, Bobel, in his deposition, offered that as one skilled in the art of designing lighting ballasts, the “voltage source means” limitation connotes a structure that will “rectify the line.” Bobel Dep. 226:15-227:25, ECF No. 84. Bobel also testified that when he drafted the term he intended to suggest physical structure to those skilled in the art. *Id.* at 229:14-18. ULT presents no expert testimony contradicting the opinions of Dr. Roberts and Bobel, that one of skill in the lighting ballast design art would understand the “voltage source means” term to disclose a rectifier.

The “voltage source means” term and Claims 1 and 18, of which it is a part, must be read in the context of the specification of the 529 Patent, although the Court relies primarily on the language of the claims themselves. *See Apex*, 325 F.3d at 1373; *see also Rodime*, 174 F.3d at 1302. Like the term at issue in *Comtech*, the Court finds that while the “voltage source means” term does not denote a specific structure, it is nevertheless understood by persons of skill in the lighting ballast design art to connote a class of structures, namely a rectifier, or structure to rectify the AC power line into a DC voltage for the DC input terminals. The Court’s prior construction of this term, and ULT’s proposed construction, exalted form over substance and disregarded the knowledge of a person of

ordinary skill in the art. *See Phillips*, 415 F.3d at 1313.

Moreover, it is in keeping with Federal Circuit precedent to refer to the functional language following “voltage source means” in determining whether the term connotes sufficient structure to avoid section 112, ¶ 6. *See Mass. Inst. of Tech.*, 462 F.3d at 1356; *see also Linear Tech.*, 379 F.3d at 1320. This functional language, “providing a constant or variable magnitude DC voltage between the DC input terminals,” when read by one familiar with the use and function of a lighting ballast, such as the one disclosed by the 529 Patent, would understand a rectifier is, at least in common uses, the only structure that would provide “a constant or variable magnitude DC voltage.” The remaining language, “between the DC input terminals,” merely describes the path of the DC voltage provided by the rectifier. According to Dr. Roberts:

The ballast described in the preferred embodiment of the 529 Patent receives AC from “a power line source,” such as an electrical outlet in an office building, converts it to DC for use during the initial start-up phase, and then, upon receipt of a “DC control signal” by the ballast’s control circuit, generates a higher frequency AC power for use in pre-heating the lamp filaments and for powering the lamps.

Roberts Decl. 6-7. It is clear to one skilled in the art that to provide a DC voltage when the source is a power line, which provides an AC voltage, a structure to rectify the line is required and is clear from the language of the “voltage source means” term. To hold otherwise would disregard the meaning this limitation would have to a person of ordinary skill in the lighting ballast design art. Although the term describes a rectifier by its function, this in and of itself is not objectionable. *See Mass. Inst. of Tech.*, 462 F.3d at 1356.

The Court also finds persuasive the fact that the “voltage source means” element’s disclosure of structure is clear excluding the generic use of “means,” which would read “voltage source . . . providing a constant or variable magnitude DC voltage between the DC input terminals.” *See Cole*

v. Kimberly-Clark Corp., 102 F.3d 524, 531 (Fed. Cir. 1996) (“Here, the claim drafter’s perfunctory addition of the word ‘means’ did nothing to diminish the precise structural character of this element.”); *see also Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348 (Fed. Cir. 2002); *Comtech*, 2007 U.S. Dist. LEXIS 97038 at *33-38. The drafter’s use of the term “means” seems unnecessary but does not diminish the element’s disclosure of structure, or a class of structures, to one skilled in the art. Accordingly, the Court finds that Plaintiff LBC has successfully overcome the presumption that section 112, ¶ 6 applies to the “voltage source means” element of Claims 1 and 18 of 529 Patent. As such, the Court construes these limitations according to their ordinary meaning in the art.

E. “Control Means” Element

The parties agree that the limitation “control means [capable of receiving (Claim 1)/able to receive (Claim 18)] control signals from the DC input terminals and from the resonant converter, and operable to effectively stop the oscillations of the converter” should be construed in accordance with section 112, ¶ 6, that it recites three functions, and lastly, they agree on the structure corresponding to two of the functions. *See* Defs.’ Resp. Br. 7. The parties disagree as to whether the specification discloses a structure related to the remaining function. *See id.*

Specifically, the parties agree that the structure corresponding to the function “operable to effectively initiate the oscillations and to effectively stop the oscillations” is set forth at column 3, line 50, through column 4, line 21 of the 529 Patent. *See id.* They also agree that the structures corresponding to the “effectively stop the oscillations” function are the diode 29, resistor 30, resistor 32, capacitor 33, transistor 48, and diac 45 connected as described in the 529 Patent. *See id.* The only disagreement between the parties is whether the 529 Patent discloses a structure to correspond

to the function of “receiving a control signal from the DC input terminals[.]” *See id.*

1. Plaintiff's Proposed Construction

To perform the function of “receiving a control signal from the DC input terminals[.]” Plaintiff LBC identifies the structure of the control circuit, labeled as 58 in Figure 1 and discussed at column 3, line 59 through column 4, line 21 of the 529 Patent. *See* Pl.’s Opening Br. 17. According to LBC, “[t]he dotted line in Figure 1 clearly shows a DC control signal, which originates at the DC input terminal B+ and travels through the filaments to the control circuit 58, where the signal is received and processed.” *Id.*

2. Defendant's Proposed Construction

Defendant ULT argues there is no corresponding structure for “receiving a control signal from the DC input terminals.” *See* Defs.’ Opening Br. 21. According to ULT, the control circuit described in the specification at column 3, line 59 through column 4, line 21 does not receive any control signal from the DC input terminals. Rather, ULT asserts that any “control signals applied to the control circuit 58 are received only from the intermediate node 27 within the resonant converter; there is no control signal input to the control circuit from the DC input terminals.”⁸ *Id.* at 22. Thus, the lack of any corresponding structure, material, or act renders Claims 1 and 18 invalid under section 112, ¶¶ 1 and 2. *See id.*

3. Court's Analysis and Construction

ULT’s argument that the specification of the 529 Patent fails to disclose a structure to perform the function of “receiving a control signal from the DC input terminals” is based on the same premise as ULT’s argument that the DC input terminals do not produce a control signal,

⁸ ULT also makes the same argument in support of their construction of the term “DC input terminals producing a control signal.” *See supra* at Part III(C)(3) where this argument is fully laid out.

which the Court rejected *supra* at Part III(C)(3). ULT argues that since the DC input terminals cannot produce a control signal then the specification of the 529 Patent does not teach DC input terminals producing a control signal; therefore, the control means cannot possibly receive a control signal from the DC input terminal and there can be no corresponding structure for a function that the patent doesn't teach. *See* Defs.' Opening Br. 22; Pl.'s Resp. Br. 8. The Court rejected ULT's premise—that the DC input terminals do not produce a control signal—*supra* at Part III(C); the Court adopts and incorporates that discussion herein. Therefore, the specification of the 529 Patent discloses a structure, namely a control circuit, at column 3, line 59 through column 4, line 21 corresponding to the function of “receiving a control signal from the DC input terminals.”

F. “Direct current blocking means”

The parties agree that the limitation “direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective” is a means-plus-function limitation governed by section 112, ¶ 6. *See* Pl.'s Opening Br. 18. The parties disagree on the named function and the corresponding structure.

1. Plaintiff's Proposed Construction

Plaintiff LBC argues the function should include language beyond that which is recited in the “direct current blocking means” limitation of Claims 1 and 18. LBC proposes to construe the function as follows: “To stop the flow of the DC control signal when the lamp is removed or defective and, upon replacement, to facilitate the heating of the filaments.” *See id.* The language describing the heating of the filaments upon replacement of the lamp does not appear in “direct current blocking means” limitation. As corresponding structure LBC proposes “a DC blocking

circuit that has a series connected secondary winding with a capacitor or diode [for Claim 18: DC blocking circuit must include diode].” *Id.*

2. *Defendant’s Proposed Construction*

Defendant ULT argues it would be improper to import language to the “direct current blocking means” which has the effect of adding a new function that is not recited in the limitation. ULT asks the Court to construe the function as follows: “stop the flow of the control signal from the DC input terminals whenever at least one gas discharge lamp is removed from the output terminals or is defective.” *See* Defs.’ Opening Br. 23. As corresponding structure, ULT suggests a “capacitor or diode connected to the heatable filament of the lamp” for Claim 1 and “a diode connected to the heatable filament of the lamp” for Claim 18. *Id.*

3. *Court’s Analysis and Construction*

The specification of the 529 Patent discloses the structure of two DC blocking circuits which are each composed of a series connected secondary winding with capacitor or diode connected across the output terminals of the lamp. *See* 529 Patent, col. 3, ll. 53-58. The specification also makes clear that the DC blocking circuit structures perform two functions: (1) preheating the filaments of the lamp via the secondary windings and (2) stopping the DC current from flowing through the circuits when the direct current path between terminal B+ and terminal CTa is broken via a capacitor or diode. *See id.* at col. 7, ll. 63-65, col. 8, ll. 38-43. However, the “direct current blocking means” limitation recites only one of these functions—“stop the flow of the control signal from the DC input terminals whenever at least one gas discharge lamp is removed from the output terminals or is defective.” The only reference to “heatable filaments” in Claims 1 and 18 comes from the preambles which describe the type of gas discharge lamp.

LBC argues that the Court should import the filament preheating function of the DC blocking circuits because the specification indicates that the structures that perform this function, the secondary windings, are component parts of the DC blocking circuits. LBC thus argues that any claim that includes within its scope a gas discharge lamp having heatable filaments necessarily implies the filament preheating function performed by the secondary windings. The Court agrees with LBC that the appropriate test for whether a limitation appearing only in the specification may be applied to limit all claims in a patent is laid out in *Alloc, Inc. v. International Trade Commission*, 342 F.3d 1361, 1370 (Fed. Cir. 2003):

[A court] must interpret the claims in light of the specification, yet avoid impermissibly importing limitations from the specification. That balance turns on how the specification characterizes the claimed invention. In this respect, this court looks to whether the specification refers to a limitation only as a part of less than all possible embodiments or whether the specification read as a whole suggests that the very character of the invention requires the limitation be a part of every embodiment. . . . [W]here the specification makes clear at various points that the claimed invention is narrower than the claim language might imply, it is entirely permissible and proper to limit the claims.

(internal citations omitted). However, neither the facts nor the reasoning of *Alloc* support LBC's proposed construction of the "direct current blocking means" limitation.

The Federal Circuit in *Alloc*, using the above-quoted test, was actually *limiting* the claimed invention in a way that was *narrower* than the claim language otherwise implied. *See id.* at 1370. Specifically at issue in *Alloc* was whether the claimed invention required "play" in every embodiment. *See id.* at 1369. The Federal Circuit determined that "the . . . specification read as a whole leads to the inescapable conclusion that the claimed invention must include play in every embodiment." *Id.* at 1370. Thus, even though the claims did not explicitly require play and thereby

appeared to have a broader scope, the court held that the scope of the claims, in light of the specification and prosecution history, must be limited to include only embodiments with play. *See id.* at 1372. In contrast, LBC seeks to add an omitted function to the language of the “direct current blocking means” limitation; by doing so LBC would *broaden* the claim language and scope rather than *narrow* it. The facts and reasoning of the *Alloc* case are distinguishable and do not support LBC’s proposed function of the “direct current blocking means” limitation. *Alloc* stands for the proposition that the scope of a patent’s claims may not be broader than the specification’s characterization of the invention. *Alloc* does not allow a patentee to expand the scope of *some* claims by importing language, in the form of an additional function for purposes of section 112, ¶ 6, from the specification.

The sole function disclosed in the “direct current blocking means” limitation is “operable to stop the flow of the control signal from the DC input terminals[.]” No additional function, such as one facilitating the heating of the filaments, is present in this limitation; and to declare as much would impermissibly depart from the actual language of the claim. *See Micro Chem. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999) (“The statute does not permit limitation of a means-plus-function claim by adopting a function different from that explicitly recited in the claim.”). The specification ties the structure of the DC blocking circuits to the function of stopping “the flow of the control signal from the DC input terminals[.]” The other function, which LBC seeks to add to the limitation, preheating the filaments, is specifically tied to the secondary windings, not the DC blocking circuit. *See* col. 7, ll. 63-65. However, according to the specification and Figure 1, the secondary windings are components of the DC blocking circuits. *See* Col. 7:53-58, Figure 1 (07, 26).

LBC argues that since the secondary windings are part of the DC blocking circuit they should be considered corresponding structure. *See* Pl.'s Opening Br. 19-20. According to LBC:

The inventor's chosen word order [referring to specification's disclosure of the DC blocking circuit] is persuasive: it emphasizes the importance of the secondary winding and demonstrates that the winding is not an afterthought but rather is central to the role played by the "DC blocking circuit." In fact, the specification teaches that the recited capacitor and diode may be interchangeable but makes no such allowance for the secondary winding. Bobel, as his own lexicographer, chose to define the blocking circuitry to include a secondary winding. In light of his unambiguous definition, Defendants' attempt to exclude the secondary winding from the corresponding structure must be rejected.

Id. at 20. ULT responds that only the capacitor or diode component of the DC blocking circuit is necessary to perform the function of "operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective" and thus the patent only discloses the DC blocking circuit, insofar as it consists of a capacitor or diode, as the corresponding structure. *See* Defs.' Resp. Br. 10-11.

In determining the proper corresponding structure for the function of stopping the flow of the control signal from the DC input terminals, the Court must look only to structures in the specification that are necessary to perform this function. *See Micro Chem.*, 194 F.3d at 1258 ("Nor does the statute permit incorporation of structure from the written description beyond that necessary to perform the claimed function."). Moreover, the structure must actually perform the function of stopping the flow of the control signal and not merely enable another structure to do so. *See Asyst Techs., Inc. v. Empak, Inc.*, 268 F.3d 1364, 1371 (Fed. Cir. 2001) ("The corresponding structure to a function set forth in a means-plus-function limitation must actually perform the recited function, not merely enable the pertinent structure to operate as intended[.]"). The secondary windings,

located in series before the capacitor or diode, depending on the claim, within the DC control circuit, cannot be structure corresponding to the function the DC blocking means.

According to ULT, “[f]irst, the specification of the ‘529 patent does not link the secondary winding with the *function* of the DC blocking means. Second, it is without question that the secondary winding is not necessary to *or capable of* performing the claimed function of the DC blocking means (i.e. blocking the direct current signal).” Defs.’ Resp. Br. 11 (emphasis in original). The Court agrees, LBC does not dispute that the secondary windings do not, and are incapable of, blocking the control signal from the DC input terminals. Direct current merely passes through the secondary windings to the capacitor or diode, which is the structure that actually performs the function of the DC blocking means within the DC control circuit. ULT goes on to argue that “the secondary winding may help enable the invention of the patent-in-suit to perform other functions does not mean that the secondary winding enables the ‘DC blocking means’ to perform its claimed function.” *Id.* Again, the Court agrees; the function of the secondary windings is to preheat the filaments in a gas discharge lamp, they have nothing to do with the function of the DC blocking means. LBC’s argument to the contrary rests merely on the fact that the drafter chose to include the secondary windings as a part of the DC blocking circuit, this placement does not affect the function of the secondary windings. *See Cardiac Pacemakers*, 296 F.3d at 1113 (“[T]he structure must not only perform the claimed function but the specification must clearly associate the structure with performance of the function.”). While the specification clearly links the DC blocking circuit to the function of stopping the flow of the control signal, it does not associate the secondary windings with any such function. The only function of the secondary windings, as disclosed by the specification, is to preheat the lamp filaments.

G. “Whenever at least one gas discharge lamp. . .”

Lastly, the parties dispute this phrase from the “direct current blocking means” of claims 1 and 18: “whenever at least one gas discharge lamp is removed from the output terminals or is defective[.]” ULT urges the Court to construe this phrase as follows:

Whenever at least one gas discharge lamp is removed from the output terminals or is defective, the direct current blocking means operates to stop flow of the control signal through the filaments to the control means, thereby to prevent self-excitation of the resonant converter and hence starting of the oscillation of the ballast.

Defs.’ Opening Br. 25. By this proposed construction, ULT again urges that a self-excited oscillating resonant converter limitation is appropriate. The Court has previously rejected this proposed construction with regard to the term “oscillating resonant converter” as it appeared in the preambles. The Court adopts and incorporates its reasoning rejecting ULT’s proposed construction limiting “oscillating resonant converter” to self-excited resonant converters *supra* at Part III(A) and finds that this phrase needs no further construction.

IV. CONCLUSION

Based on the foregoing, the Court construes the following terms and limitations in the 529 Patent as follows:

1. In the preambles to Claims 1 and 18 respectively of the 529 Patent “oscillating resonant converter producing oscillations” means “a circuit, or portion of a circuit, containing inductance, capacitance and at least one electronic switching device (such as a transistor) that operates to convert direct current into alternating current.”
2. In the preambles to Claims 1, 4, and 18 respectively of the 529 Patent “DC input terminals” means “terminals for receiving a DC supply voltage.”

3. In the preamble to Claim 1 of the 529 Patent “producing a control signal” means “serving as the origin of direct current that travels along a direct current path from the DC input terminals, through the filament or filaments, and to an input terminal of the control means, but which does not pass through the DC blocking means.”
4. In Claims 1 and 18 of the 529 Patent “voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals” shall be construed according to its ordinary meaning and in accordance with the Court’s reasoning in Part III(D)(3) *supra*.
5. In Claims 1 and 18 of the 529 Patent “control means capable of receiving a control signal from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter” shall be construed according to section 112, ¶ 6 as reciting three functions with the specification disclosing the structures corresponding to those functions as set forth *supra* in Part III(E).
6. In Claims 1 and 18 of the 529 Patent “direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective” shall be construed according to section 112, ¶ 6 as reciting the function “operable to stop the flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective,” and the specification disclosing the structure corresponding to that function as a capacitor or diode within the control circuit, as

set forth *supra* in Part III(F)(3).

7. In Claims 1 and 18 of the 529 Patent the phrase “whenever at least one gas discharge lamp is removed from the output terminals or is defective” shall be construed according to its ordinary meaning and in accordance with the Court’s reasoning in Part III(G)(3) *supra*.

SO ORDERED on this **2nd** day of **December, 2010**.


Reed O'Connor
UNITED STATES DISTRICT JUDGE

CIVIL ACTION NO. 7:09-CV-29-O

Andrzej “Andrew” Bobel. The ‘529 Patent covers a lighting ballast that powers florescent lamps with heatable filaments. An electronic ballast practicing the ‘529 Patent operates in three different stages: (1) the initial start-up of the ballast, (2) the shut-down or sleep-mode of the ballast, and (3) the re-starting of the ballast after an inoperable lamp has been replaced. Pl.’s Opening Br. Cl. Const. 4, ECF No. 84. The invention was intended to address significant technical challenges facing the ballast industry in 1993; specifically, how to preserve the integrity of the ballast by not drawing power from a power line source when a lamp is removed or defective, and by not having to turn the power OFF and ON when the lamp is replaced. *Id.* at 6. The invention covered by the ‘529 Patent was intended to remedy these issues in a safe, energy efficient, and affordable manner. *Id.*

LBC sues Defendant ULT claiming infringement of the ‘529 Patent because ULT manufactures, uses, or sells electronic ballasts utilizing circuitry that monitors the voltage across one or more lamps and provides end-of-life protection for multiple types of failures. Pl.’s Orig. Compl. 4, ECF No. 1. LBC identifies more than thirty allegedly infringing product schematics, several of which apply to more than one product or generation of products. ULT has grouped the accused products into fourteen groups, taking into account differences in LBC’s infringement analyses and differences in the structure and operation of the accused products. ULT denies any infringement and seeks a finding of non-infringement and invalidity of the asserted claims.

II. LEGAL STANDARDS

Summary judgment is appropriate “if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law.” Fed. R. Civ. P. 56(a). A dispute regarding a material fact is “genuine” where the evidence is such that a reasonable jury could return a verdict favor of the nonmoving party. *See Anderson v. Liberty*

Lobby, Inc., 477 U.S. 242, 248 (1986). In considering a motion for summary judgment, a court must view all inferences drawn from the factual record in the light most favorable to the nonmoving party. See *Matsushita Elec. Indus. Co. v. Zenith Radio*, 475 U.S. 574, 587 (1986).

In a patent infringement case, a court first determines the proper construction of the patent claims by establishing, as a matter of law, the scope and boundaries of the subject-matter of the patent. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370, 384-85 (1996). Second, the trier of fact compares the properly construed claims to the allegedly infringing device(s) and determines whether there has been an infringement. *Id.* Here, the latter question is at issue.

Pursuant to 35 U.S.C. § 112 ¶ 6 a patentee may express a claim limitation by reciting a function to be performed by a generic means, rather than reciting in the claim the actual structure for performing the particular function. Section 112, ¶ 6 provides:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Section 112, ¶ 6 thus “operates to restrict claim limitations drafted in such functional language to those structures, materials, or acts disclosed in the specification (and their equivalents) that perform the claimed function.” *Personalized Media Comm’ns, LLC v. Int’l Trade Comm’n*, 161 F.3d 696, 703 (Fed. Cir. 1999). “The point of the requirement that the patentee disclose particular structure in the specification and that the scope of the patent claims be limited to that structure and its equivalents is to avoid pure functional claiming.” *Aristocrat Techs. Australia Pty Ltd. v. Int’l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008).

Literal infringement of a properly construed claim is a question of fact. *See Applied Med. Res. Corp. v. U.S. Surgical Corp.*, 448 F.3d 1324, 1332 (Fed. Cir. 2006). A means-plus-function claim term will literally cover an accused device when the relevant structure in the accused device performs the identical function recited in the claim and that structure is identical or equivalent to the corresponding structure in the specification. *See Intellectual Sci. & Tech., Inc. v. Sony Elecs., Inc.*, 589 F.3d 1179, 1183 (Fed. Cir. 2009). The proper test for equivalent structure “is whether the differences between the structure in the accused device and any [structure] disclosed in the specification are insubstantial.” *Chiuminatta Concrete Concepts v. Cardinal Indus.*, 145 F.3d 1303, 1309 (Fed. Cir. 1998). An insubstantial change is one which adds nothing of significance to the structure, material, or acts disclosed by the specification. *See Valmont Indus., Inc. v. Reinke Mfg. Co.*, 983 F.2d 1039, 1043 (Fed. Cir. 1993). One way to approach the question of equivalency is to ask whether the structures perform the same function in substantially the same way to achieve substantially the same result. *See IMS Tech., Inc. v. Haas Automation, Inc.*, 206 F.3d 1422, 1437 (Fed. Cir. 2000). Known interchangeability between the structure in the accused device and the disclosed structure is also an important factor, although it is not dispositive. *See id.* at 1435; *see also The Toro Co. v. Deere & Co.*, 355 F.3d 1313, 1324 (Fed. Cir. 2004).

The Federal Circuit has often applied a “reduced version” of the doctrine of equivalents test in the section 112, ¶ 6 context to determine whether the differences between the corresponding structure and the structure in the accused device are substantial. *See IMS Tech.*, 206 F.3d at 1437. As under the doctrine of equivalents, the context of the invention should be taken into account in the section 112, ¶ 6 equivalence analysis. *See id.* at 1436. According to the Federal Circuit:

[T]wo structures that are equivalent in one environment may not be equivalent in another. More particularly, when in a claimed “means” limitation the disclosed physical structure is of little or no importance to the claimed invention, there may be a broader range of equivalent structures than if the physical characteristics of the structure are critical in performing the claimed function in the context of the claimed invention. Thus, a rigid comparison of physical structures in a vacuum may be inappropriate in a particular case. Indeed, the statute requires two structures to be equivalent, but it does not require them to be “structurally equivalent,” i.e., it does not mandate an equivalency comparison that necessarily focuses heavily or exclusively on physical structure.

Id. Therefore, the importance of the corresponding structure to the claimed invention should be considered in the equivalency comparison. *See id.*

Most of LBC’s infringement contentions are based on a theory of literal infringement. However, with respect to accused products in Groups 5, 8, and 9, LBC asserts infringement under the doctrine of equivalents (“DOE”). ULT also seeks summary judgment on its counterclaims of invalidity of the asserted claims. The Court will address these matters below.

III. ANALYSIS

ULT moves for summary judgment against LBC as follows: (1) granting ULT a declaratory judgment counterclaim of non-infringement with respect to Claims 3, 4, and 18 of the ‘529 Patent and certain ULT products that LBC dropped from the case; (2) dismissing with prejudice all patent infringement claims against ULT and granting ULT’s declaratory judgment of non-infringement of the ‘529 Patent; and (3) ruling in favor of ULT’s first and third affirmative defenses and declaratory judgment of invalid for anticipation under 35 U.S.C. § 102 and invalid as indefinite. The Court will first address ULT’s motion with respect to LBC’s infringement claims, and secondly ULT’s invalidity arguments.

A. Infringement Claims

ULT first moves for summary judgment with regard to all infringement claims based on Claims 3, 4, and 18 of the '529 Patent. According to ULT, LBC's expert on infringement, Dr. Roberts, has not offered any opinion related to these claims and admitted in his deposition that no ULT products infringe on these claims. Likewise, ULT argues that LBC has agreed that no Group 7 ULT products infringe on any asserted claims of the '529 Patent. LBC does not dispute that summary judgment is appropriate with regard to all infringement claims related to Claims 3, 4, and 18 and all infringement claims related to ULT's Group 7 products. *See* Pl.'s Resp. Mot. Summ. J. 5, ECF No. 135 ("For those products that were initially accused of infringement but for which Dr. Roberts could not confirm infringement, those products have been dropped from this lawsuit."). In any event, LBC has presented no evidence in response to ULT's motion that any products infringe Claims 3, 4, and 18 or that any Group 7 products infringe any asserted claim of the '529 Patent. Therefore, summary judgment is appropriate with respect to any infringement claims based on these claims or products. Accordingly, the analysis below pertains only to LBC's remaining infringement claims based on Claims 1, 2, and 5 of the '529 Patent.

ULT also seeks summary judgment with regard to LBC's remaining claims of infringement of the '529 Patent. First, ULT argues that no accused product contains either the same or an equivalent structure as the claimed "control means" of Claim 1, which would also entitle ULT to summary judgment on dependent Claims 2 and 5. LBC agrees that the accused products do not contain the same structure and rests its infringement claims, with respect to the "control means" limitation, on an equivalent structure in the accused products. Specifically, ULT asserts that "LBC has not, and cannot, come forward with sufficient evidence to prove its infringement claim" because "Dr. Roberts' equivalency opinion . . . (a) fails to specify what structures perform the 'control means' functions and why they are equivalent, (b) improperly

expands the scope of the claim to encompass *any* electronic circuit that performs the claimed functions, and (c) ignores Bobel's distinction between his invention and the prior art." Def.'s Br. Supp. Mot. Summ. J. 13, ECF No. 127 (emphasis in original). ULT also argues that its "products are substantially different from the claimed 'control means,' both in the way they operate and in the results obtained." *Id.* For these reasons, ULT argues, summary judgment of non-infringement is appropriate because the accused products do not contain an equivalent structure to the "control means" limitation of Claims 1, 2, and 5.

LBC disputes ULT's assertions with regard to the "control means" and argues that it has introduced sufficient evidence to raise a fact issue on infringement. LBC begins by criticizing ULT's component-by-component analysis, arguing that "ULT seeks to transform each . . . component of the recited control means, as described in the preferred embodiment and . . . shown in Figure 1 of the '529 Patent, into an additional claim limitation." Pl.'s Resp. 16. LBC also disputes ULT's characterization of the sufficiency of Dr. Roberts's analysis in comparing the "control means" limitation and its corresponding structure to the equivalent structures in the accused products; "Dr. Roberts has established that the accused products literally infringe the 'control means' limitation through . . . an equivalent structure[, and] [a]t a minimum, he has created a fact issue[.]" *Id.* at 19. Lastly, LBC asserts that ULT misquoted and mischaracterized Bobel's statements distinguishing his invention from the prior art to distort their true meaning, which does not support ULT's position. LBC urges the Court to deny ULT's motion with regard to the "control means" limitation because a reasonable jury could determine, based on the evidence, that ULT's products literally infringe this limitation.

In its Amended *Markman* order, the Court construed "control means capable of receiving control signals from the DC input terminals and from the resonant converter, and operable to

effectively initiate the oscillations, and to effectively stop the oscillations of the converter” in accordance with section 112, ¶ 6, as reciting three functions with the corresponding structure being control circuit 58, described in the specification of the ‘529 Patent at column 3, line 59 through column 4, line 21. *See* Am. Mem. Op. Order 24-26, ECF No. 107. At the *Markman* stage the parties disputed only whether the specification of the ‘529 Patent disclosed a structure corresponding to the function of “capable of receiving control signals from the DC input terminals.” The Court found that the control circuit 58 corresponded to this function, as with the other two functions of the “control means” limitation. *See id.* In his expert report, Dr. Roberts, LBC’s infringement expert, further subdivides the functions of the “control means” limitations as follows: “(1) control means (a) capable of receiving a control signal from the DC input terminals and (b) operable to effectively initiate the oscillations, and (2) control means (a) capable of receiving a control signal from the resonant converter, and (b) operable to effectively stop the oscillations.” Infringement Report of Dr. Victor Roberts 29, Pl.’s App. Supp. Resp. Def.’s Mot. Summ. J. 38, ECF No. 136. For purposes of summary judgment, the Court will adopt Dr. Robert’s formulation of the functions recited in the “control means” limitation, both for ease of reference and because they are not inconsistent with the Court’s construction of this limitation in the Amended *Markman* order.

The control circuit 58 is described in the ‘529 Patent as consisting of three control terminals and three series current paths between terminals CTa and CTb. The specification describes the control circuit 58 in full as follows:

A control circuit 58 has three control terminals CTa, CTb and CTc. The terminal CTa is connected to the intermediate terminal 27; the terminal CTb is connected to the terminal B-; and the terminal CTc is connected to the base electrode of the transistor 52. The control circuit 58 has a first series current path between terminals CTa, CTb, and the path has a diode 39, a resistor 40, and

a capacitor 42 connected in series, via a node 41 formed between the resistor 40 and the capacitor 42. A diac 44 is connected between the node 41 and the terminal CTc. A small signal npn transistor 43 is connected with its collector electrode to the node 41, and with its emitter electrode to the terminal CTb.

The control circuit 58 has a second series current path between terminals CTa, CTb, and the path has a diode 34, a resistor 35, and a capacitor 38 connected in series via a node 36 formed between the resistor 35 and the capacitor 38. The transistor 43 has its base electrode connected to the node 36. A resistor 37 is connected between the node 36 and the terminal CTb.

The control circuit 58 has a third series current path between terminals CTa, CTb, and the path has a diode 29, a resistor 30, and a capacitor 33 connected in series via a node 31 formed between the resistor 30 and the capacitor 33. A resistor 32 is connected to the node 31 and to the terminal CTb.

A small signal npn transistor 48 has its collector electrode connected to the terminal CTc and its emitter electrode connected to the terminal CTb. A diac 45 is connected between the node 31 and a based electrode of the transistor 48.

'529 Patent, Col. 3, l. 59 - Col. 4, l. 21. Thus, the control circuit, as disclosed by the specification, performs the four functions using the various components arranged in three series current paths as described above.

All four functions of the "control means" deal with starting and stopping the oscillations of the resonant converter. The control signal from the DC input terminals communicates to the control circuit when to initiate oscillations. The signal from the resonant converter communicates to the control circuit when to stop oscillations. When the power is cycled on, or a new fluorescent lamp is placed in the terminals, the DC control signal will start to flow in the direct current path DCP until it reaches the control circuit. Once in the control circuit, it will flow through the various components listed above in the first series current path. The current flow through the first series current path will trigger transistor 52 and allow alternating current to flow in the resonant circuit. After the lamp strikes, the DC current entering the control circuit will flow through the various components listed above in the second series current path. The current

flow through the second series current path will trigger transistor 43 thereby discharging capacitor 42, in the first series current path, and preventing the transistor 52 from being triggered a second time, which would cause the circuit to fail.

When a fluorescent lamp is removed from its holders, a current will flow through the various components listed above in the third series current path. The current flow through the third series current path will trigger transistor 48 momentarily. The transistor 48 will turn off the device and the oscillations will cease. Oscillations will not begin again until direct current flows into the control circuit and through the first series current path.

The parties agree that the accused products do not utilize the same structure or structures as the control circuit to perform the functions of receiving control signals and initiating and stopping the oscillations of the resonant circuit. However, LBC contends that the accused products utilize an equivalent structure within the meaning of section 112, ¶ 6. In all accused products, the alleged equivalent structure includes, as a component, either an integrated circuit or microprocessor to control, among other things, the oscillations of the resonant circuit. *See* Pl.'s Resp. 21. While the components of the equivalent structure may differ depending on the accused product at issue, in their briefing, the parties clearly focus on the integrated circuits or microprocessors relative to the control circuit 58 of the '529 Patent.¹ Thus, the point of dispute between the parties, for purposes of summary judgment, is whether any structure could be equivalent to the "control means" when it uses an integrated circuit or microprocessor to control the oscillations of the resonant circuit.

¹ As noted *supra*, LBC accuses more than thirty allegedly infringing product schematics, many of which apply to more than one product or generation of products. To simplify discussion, ULT divided the accused products into fourteen groups which take into account both differences in Dr. Roberts's infringement analysis and material differences in the products' structure and operation. *See* Def.'s Br. Supp. 7.

ULT criticizes Dr. Roberts's equivalent structure analysis on this point. In its criticisms, ULT focuses primarily on one statement in the main body of his expert report where Dr. Roberts explains, at a high level, the substance of his section 112, ¶ 6 equivalent structure analysis. See Report 30-31, Pl.'s App. 39-40. ULT largely ignores the attachments to Dr. Roberts's report. However, it is in these attachments, which include infringement charts, product schematics, data sheets for the integrated circuits, and source code for microprocessors, where the bulk of the details of Dr. Roberts's analysis is contained. In these attachments, Dr. Roberts details the specific components of the control circuitry in each of the accused products. He also explains how each of the components performs the functions of the "control means" limitation. The Court is satisfied that Dr. Roberts's report, and the attachments thereto, suffice to raise a fact issue with regard to whether the accused products include an equivalent structure to the "control means" limitation.

ULT also argues that Dr. Roberts's equivalent structure analysis fails to take into account certain statements, made by Bobel during prosecution, disclaiming similar control structures in prior art. Bobel's full statement reads as follows:

Zuchtriegel, unlike the present invention, as positively defined by Claim 1, does not disclose a specific control means that is operable to effectively initiate and stop the oscillations of the resonant converter. Further, direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals whenever at least one gas discharge lamp is removed from the output terminals or is defective, is not taught. This particular arrangement of control means and direct current blocking means is neither taught nor suggested by Zuchtriegel.

Pl.'s App. 626-27. ULT's quotations of this statement omit the second sentence above. The Court agrees with LBC that this statement, when read in context, distinguishes the prior art by asserting that the '529 Patent includes a particular arrangement of the control means and direct

current blocking means. This statement does not constitute a clear and unmistakable surrender of any subject matter or particular structure related to the “control means.” See *Cordis Corp. v. Medtronic Ave, Inc.*, 511 F.3d 1157, 1177 (Fed. Cir. 2008).

Lastly, ULT argues that the alleged “control means” of the accused products are substantially different from the control circuit of the ‘529 Patent such that no reasonable jury could conclude that the accused products use an equivalent structure. In arguing this point, ULT submits evidence regarding the operation of the integrated circuits and microprocessors and how they are different from the components and operation of control circuit 58 in the ‘529 Patent. However, ULT’s evidence is insufficient to conclude, as a matter of law, that no reasonable jury could find that a “control means” using an *integrated circuit or microprocessor* is equivalent structure to the “control means” disclosed in the ‘529 Patent. Additional considerations also counsel against holding that there is no genuine dispute of material fact as to whether the accused products utilize and equivalent structure to the “control means” of the ‘529 Patent.

First, the Court believes that there is sufficient evidence in the record to conclude that a person of ordinary skill in the art might consider an integrated circuit or microprocessor to be interchangeable with the control circuit 58. The evidence indicates that both types of structures perform the functions of receiving control signals and controlling the oscillations of the resonant circuit. There is a genuine dispute of material fact as to whether an integrated circuit or microprocessor performs these functions in a substantially different way with substantially different results. Secondly, as Dr. Roberts has discussed in his report, the focus or true innovation of the ‘529 Patent is the unique manner in which it senses removal of, or certain defects in, a lamp and shuts down the ballast in response, keeping it from starting again until a new lamp is placed in the output terminals. The focus of the invention is not on the particular

means by which it starts and stops the oscillations of the resonant circuit. Indeed the specification indicates that it may be equipped with all types of oscillatory circuits, including driven circuits, one type of which is an integrated circuit or microprocessor. *See* '529 Patent, Col. 11, ll. 34-39. Accordingly, reading the "control means" limitation in the context of the '529 Patent, it is appropriate to consider a broader range of equivalent structures to the control circuit 58. *See IMS Tech.*, 206 F.3d at 1437. Thus, resolving all doubts and inferences from the evidence in favor of the non-moving party, LBC, the Court finds that there is a genuine dispute of material fact as to whether the accused products include an equivalent structure to the "control means" of the '529 Patent. Therefore, summary judgment in favor of ULT that the accused products do not contain an equivalent structure to the "control means" limitation is inappropriate.

Next, ULT seeks summary judgment because the accused products do not include the "direct current blocking means" limitation. According to ULT, "[u]sing the ordinary meaning of defective, ULT's products do not infringe." Def.'s Br. Supp. 29. ULT bases its argument on a new construction of the latter half of the "direct current blocking means" limitation, which reads "whenever at least one gas discharge lamp is removed from the output terminals or is defective[.]" ULT proffers a definition of "defective" that takes into account all types of fluorescent lamp defects. In sum, ULT argues that "the reference to a 'defective' lamp in claim 1, when construed in accord with its ordinary meaning, encompasses any lamps with a broken or defective filament as well as other types of defects where no filaments are broken or defective, such as degassed lamps." *Id.* at 33. On the basis of this definition, ULT contends that none of the accused products infringe. "First, if the lamps are defective in any way that does not involve a broken or removed filament . . . the DC control signal path will not be stopped by the 'direct current blocking means.'" *Id.* "Second, in several of the products, one or more of the filaments

can be 'open,' that is, broken or removed, and yet the DC control signal path traced by Dr. Roberts will not be broken because it does not pass through that filament or filaments." *Id.* at 34. For these reasons, ULT argues summary judgment is appropriate because the accused products do not include a "direct current blocking means" performing the function of "operable to stop the flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective[.]"

LBC argues that ULT's proffered construction of the "direct current blocking means" "focuses on the term 'defective' and tries to apply its plain ordinary meaning, devoid of any context." Pl.'s Resp. 33 n.12. Rather, according to LBC, "a careful reading of [the specification of the '529 Patent], confirm[s] that the DC blocking means limitation is focused on the DC control path, such that the DC blocking means must be operable to stop the flow of the DC control signal whenever that path is broken." Pl.'s Resp. 35. LBC proposes to construe the "whenever" clause of the "direct current blocking means" limitation as: the DC blocking means is operable to stop the flow of the DC control signal "whenever the DC control path through the filaments is broken due to lamp removal or a broken filament." Pl.'s Resp. 25. LBC argues that its proffered construction is the only one that takes into account the meaning of the "direct current blocking means" in the context of the specification of the '529 Patent. Based on its construction, LBC asserts that there are genuine disputes of material fact whether the accused products infringe literally or, in some cases, under the Doctrine of Equivalents.

Since ULT's non-infringement position is based on a newly proffered construction of the "direct current blocking means" limitation, the Court will begin by construing that term. The limitation reads in full: "direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one

gas discharge lamp is removed from the output terminals or is defective.” The Court previously construed this term in accordance with section 112, ¶ 6 as a means-plus-function limitation. *See* Am. Mem. Op. & Order 26-32. The Court found the recited function to be “operable to stop the flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective[.]” *See id.* at 29-30, 33. As corresponding structure, the Court identified “a capacitor or diode within the control circuit[.]” *See id.* at 30-31, 33. The parties do not contest these settled constructions; rather, ULT seeks to further construe the meaning of the “whenever” clause of the “direct current blocking means” limitation.

ULT’s proposed construction focuses on the term “defective.” The gist of ULT’s construction of “defective,” as used in the “whenever” clause, is that the “direct current blocking means” should block the DC control signal when any fluorescent lamp connected to the ballast is defective in any way, whether it be a degassed lamp, broken filament, or otherwise.

LBC urges the Court to reject ULT’s construction because it seeks to construe the “whenever” clause without reference to the meaning of the clause in the context of the ‘529 Patent. LBC’s construction, as noted above, focuses on the DC control path: the DC blocking means is operable to stop the flow of the DC control signal whenever the DC control path through the filaments is broken due to lamp removal or a broken filament.

The Court agrees with LBC and adopts its proposed construction. A careful review of the specification of the ‘529 Patent reveals that it speaks in terms of blocking the DC control signal whenever the DC control path is broken. *See* ‘529 Patent, Col. 8, l. 13-18 (“When the voltage across the capacitor reaches a level sufficient enough to turn ON the transistor 43, the capacitor 42 will be held discharged for any time period as long as: (i) there is an unbroken direct current path DCP between terminal B+ and terminal CTa . . .”); Col. 8, l. 24-42 (“While the device is

operation in Mode A, if the fluorescent lamp 16 is removed out of its holders . . . [t]he direct current path DCP between terminal B+ and terminal CTa is broken due to missing filaments 12, 15 of lamp 16. The DC current will not flow through DC blocking circuits 57, 50”); Col. 8, l. 47-50 (“The fluorescent lamp 16 is now re-inserted into its holders, that will complete the direct current path . . . between terminal B+ and terminal CTa, and the device will start as in Mode A above.”); *see also* Col. 7, l. 51-53. The Court also agrees with LBC that “a careful reading of Column 8, line 51 through Column 9, line 3, along with Figures 1-3, confirm that the DC blocking means limitation is focused on the DC control path[.]” Pl.’s Resp. 35.

ULT fails to direct the Court to any language in the specification of the ‘529 Patent supporting its broad construction of the “whenever” clause.² *See Nazomi Commc’ns, Inc. v. Arm Holdings, PLC*, 403 F.3d 1364, 1368 (Fed. Cir. 2005) (Courts should look first to the intrinsic record of a patent, including the claims and specification, to determine the meaning of words in the claims.). Rather, ULT relies primarily on extrinsic evidence, including a dictionary and expert testimony, to define the term “defective” independent of the claims and specification of the ‘529 Patent. This is not a proper claim construction. *See Interactive Gift Express, Inc. v. Compuserve, Inc.*, 256 F.3d 1323, 1332 (Fed. Cir. 2001) (“If the meaning of the claim limitations is apparent from the totality of the intrinsic evidence, then the claim has been construed.”). Since the specification makes clear that the patent defines “defective” in terms of a broken DC control signal path, it is not necessary to resort to extrinsic sources to define it.

While the Court understands that ULT’s construction of the “whenever” clause is entirely logical from a plain language standpoint, it does not take into account the teachings of the ‘529

² ULT points to two statements from the specification, however, both of these statements refer to faults sensed by the “control means” or the control signal from the resonant converter. *See* Col. 11, ll. 9-14; Col. 3, ll. 19-22. These statements are not relevant to defining defects sensed by the “direct current blocking means.”

Patent. To accept ULT's construction the Court must define the term "defective" without reference to the specification's discussion of the direct current flow through the ballast. Accordingly, the proper construction of the "direct current blocking means" is as follows: the direct current blocking means is operable to stop flow of the control signal from the DC input terminals, whenever the direct current path between terminal B+ and terminal CTa is broken. This construction does not disregard the actual language of claim, "whenever at least one gas discharge lamp is removed from the output terminals or is defective[,]" but defines "removed from the output terminals or is defective" based on the specification's focus on the direct current control path. Thus, a defect may be defined as any condition that would break the direct current path, meaning either lamp removal or a broken filament in the current path. The Court will consider ULT's non-infringement argument based on this construction of the "whenever" clause of the "direct current blocking means" limitation.

ULT argues that the accused products do not infringe the "direct current blocking means" limitation because none of them are operable to stop the flow of the control signal whenever at least one gas discharge lamp is removed or defective. However, this argument is predicated on ULT's proffered construction of defective, which was rejected above. This construction takes into account the fact that, in many of the accused products, the DC control signal will not be interrupted as a result of various faults; therefore, if the "direct current blocking means" is construed to require stopping the flow of the control signal in the event of any type of defect, the accused products, which do not do so, would not infringe. ULT offers no argument or evidence to support a contention that under the above-adopted construction of the "whenever" clause, the accused products do not infringe the "direct current blocking means" as a matter of law.

Accordingly, summary judgment that none of the accused products literally infringe the “direct current blocking means” is inappropriate.

LBC also relies on the Doctrine of Equivalents (“DOE”) to prove infringement of the “direct current blocking means” for accused products in Groups 5, 8, and 9. In these products the “direct current blocking means” does not stop the control signal but redirects it through a shunt resistor which has the effect of substantially reducing the magnitude of the DC control current such that the “control means” can detect lamp removal or reinsertion. *See* Pl.’s Resp. 26-27 (quoting Report of Dr. Roberts). In his report, Dr. Roberts explains why he believes that these products infringe under the DOE and the basis for his opinion, including the structures used in the accused products, through infringement charts, and why he believes a person of ordinary skill in the art would believe the differences to be insubstantial. *See* Report of Dr. Roberts 34-35. The Court is satisfied that this evidence is sufficient to raise a fact issue as to whether the accused products in Groups 5, 8, and 9 infringe under the DOE. However, ULT also challenges the procedural propriety of LBC’s DOE infringement contentions.

ULT argues that the Court should strike LBC’s DOE infringement contentions and grant summary judgment with regard to all accused products in Groups 5, 8, and 9, since LBC failed to disclose its reliance on the DOE. The Court agrees and will strike LBC’s DOE infringement contentions related to the “direct current blocking means.” Several considerations underlie the Court’s decision on this issue. First of all, LBC utterly failed to comply with Northern District of Texas Miscellaneous Order No. 62, ¶¶ 3-1, 3-6. These paragraphs require a party to disclose “specifically and in detail where each element of each asserted claim is found within each accused instrumentality” and “[w]hether each element of each asserted claim is claimed to be literally present or present under the doctrine of equivalents in the accused instrumentality.”

Misc. Order No. 62 ¶ 3-1. They also permit a party to amend or supplement these disclosures after receiving further discovery, or after the court issues its final claim construction ruling.

Misc. Order No. 62 ¶¶ 3-1, 3-6.

LBC has never amended or supplemented its September 11, 2009 infringement contentions, which contained only a boilerplate reservation of rights to assert infringement under the DOE. Such boilerplate language was insufficient to place ULT on notice of LBC's specific DOE infringement theory. *See Rambus, Inc. v. Hynix Semiconductor, Inc.*, 2008 WL 5411564 *3 (N.D. Cal. Dec. 29, 2008). LBC's final infringement contentions were due January 3, 2011; however, LBC never moved for an extension of this deadline or otherwise indicated that it planned to add infringement contentions under the DOE. ULT did not learn of LBC's DOE theory until LBC served Dr. Roberts's expert report on January 24, 2011. This non-disclosure effectively deprived ULT of the opportunity to assert additional invalidity contentions based on LBC's DOE contentions.³ Setting aside any time constraints relative to the approaching summary judgment deadlines and trial, in order to properly amend its invalidity contentions, ULT would have been required to seek leave of court since that deadline had passed as well.

LBC argues that in serving Dr. Roberts's expert report it was in fact serving its final infringement contentions based on an agreement between the parties. However, ULT denies that there was any agreement between the parties allowing LBC to serve its final infringement contentions approximately three weeks late and in the form of an expert report. LBC does not

³ LBC asserts that ULT was not prejudiced because ULT's infringement expert included his rebuttal opinions relative to LBC's DOE theory. However, this does not excuse LBC's non-disclosure of its DOE infringement contentions. It was entirely proper and prudent for ULT to attempt to address those arguments in event that LBC could demonstrate that the delay was not within its control or diligence in complying with the local patent rules. If ULT chose not to address LBC's DOE contentions it would run the risk of finding itself in the same position as LBC on this issue. In sum, ULT did not waive its right to complain of LBC's non-disclosure by addressing their DOE contentions on the merits.

offer any evidence of such an agreement. Otherwise, LBC offers no explanation for why it failed to comply with the Northern District's patent rules relating to disclosure of infringement contentions. To the extent that an agreement between the parties did permit LBC to serve detailed claim charts, as a part of its infringement contentions, for three representative products only, LBC properly bore the risk that the representative products it chose might not in fact be representative of its final infringement contentions in that none of the three products infringed under the DOE.

In sum, the Court cannot simply overlook the fact that LBC completely failed to fully disclose its infringement contentions until it served the report of its infringement expert. LBC effectively seeks leave from the Court to amend its infringement contentions via its response to ULT's motion for summary judgment. The Court will not permit such a late amendment of infringement contentions, especially when they are in direct violation of the local rules, and the offending party has not demonstrated any effort to comply those rules. LBC has given no reason for waiting until it served its infringement expert's report to fully disclose its infringement allegations.⁴ Likewise, LBC has not shown that the delay was outside of its control. Therefore, the Court will strike LBC's untimely DOE contentions.

LBC's infringement allegations relating to all products in Groups 5, 8, and 9 are based on a DOE theory. *See* Pl.'s Resp. 26-27. Since the Court has stricken LBC's DOE infringement contentions related to these products, and LBC does not contend or present evidence that these products infringe literally, summary judgment in favor of ULT that products in Groups 5, 8, and 9 do not infringe is appropriate and will be granted.

⁴ LBC complains separately of discovery malfeasance on the part of ULT and its delays in turning over certain documents. The Court declines to wade into this matter as it is not properly before the Court.

In sum, the Court has construed the “whenever” clause, and more specifically the term “defective,” within the “direct current blocking means” limitation. Based on this construction, the Court has determined that there are genuine disputes of material fact as to whether the accused products infringe literally. The Court has also found that a genuine dispute of material fact exists as to whether the accused products contain an equivalent structure, within the meaning of section 112, ¶ 6, to the “control means” limitation. Accordingly, ULT’s motion for summary judgment based on non-infringement of the ‘529 Patent should be denied.

B. Invalidity for Anticipation

ULT also moves for summary judgment on its first and third affirmative defenses of invalidity of the patent-in-suit for anticipation under 35 U.S.C. § 102. ULT bases its anticipation defenses on two Japanese patents, JP 61-153997 (“JP ‘997”) and JP 1-157099 (“JP ‘099”). According to ULT, each of these patents qualify as prior art references under § 102(b) and teach each limitation of the asserted claims of the ‘529 Patent. LBC does not dispute that JP ‘997 and JP ‘099 constitute “printed publication[s] in . . . a foreign country” under § 102(b). Therefore, the Court will proceed under the assumption that both references qualify as prior art references.

In order to invalidate the asserted claims of the ‘529 Patent, ULT must prove that one or both of these prior art references anticipate each limitation of the asserted claims and that there are no genuine disputes of material fact on the issue. “Anticipation requires a showing that each element of the claim at issue, properly construed, is found in a single prior art reference.” *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1323 (Fed. Cir. 2011). Therefore, ULT must prove, as a matter of law, that each element of the asserted claims, as construed by the Court, are found in one of the prior art references, JP ‘997 or JP ‘099.

Before addressing the merits of ULT's anticipation defenses, the Court must resolve LBC's objection to ULT's primary evidence of anticipation, the expert report of Dr. Michael Giesselmann, ULT's expert on invalidity. *See* Pl.'s Objs. Evid. Supp. Def.'s Mot. Summ. J. 2, ECF No. 134. LBC objects to the report and the attachments thereto and moves to strike it because it is unsworn and is therefore hearsay not subject to any exception. *See id.* In response, ULT attached the Declaration of Dr. Giesselmann, in which he verifies that his originally unsworn report, and the attachments thereto, set forth the substance and basis of his opinions regarding invalidity of the '529 Patent. *See* Def.'s Resp. Pl.'s Objs. 1-2, Ex. A, ECF No. 139. If an expert report is objected to as unsworn, the deficiency may be corrected by filing a sworn declaration endorsing the unsworn report. *See Straus v. DVC Worldwide, Inc.*, 484 F. Supp. 2d 620, 633-34 (S.D. Tex. 2007). Accordingly, with the sworn declaration, Dr. Giesselmann's report and its attachments and exhibits are admissible summary judgment evidence. Thus, LBC's objections thereto are overruled.⁵

ULT argues, and presents evidence in support, that JP '997 and JP '099 each contain every element of the asserted claims of the '529 Patent. *See* Expert Report of Dr. Michael Giesselmann, Ex. C6, App. Supp. ULT's Mot. Summ. J., ECF No. 127. LBC presents evidence from its invalidity expert, Dr. Regan Zane, in his rebuttal report, contesting only whether the prior art references contain the "direct current blocking means" limitation of Claim 1 and the

⁵ LBC also objects to and moves to strike Exhibits 11 and 12 to ULT's Appendix In Support of Motion for Summary Judgment, ECF No. 127. LBC objects that the underlying documents, presumably the Japanese Patents themselves, are not competent summary judgment evidence under Rules 802 and 901 of the Federal Rules of Evidence. These objections are overruled. The Japanese patents are self-authenticating documents under Rule 902 and would qualify under Rule 802(8) as business records. Moreover, a patent submitted as prior art is not hearsay, rather it is offered for the purpose of demonstrating its existence and the invention described therein; it is not offered to prove the truth of matters asserted in the document. *See Joy Techs., Inc. v. Manbeck*, 751 F. Supp. 225, 233 n.2 (D.D.C. 1990).

limitations of dependent Claims 2 and 5 respectively.⁶ *See* Expert Report of Dr. Regan Zane, Ex. 2, Pl.'s App. Therefore, the Court will assume, for purposes of summary judgment, that both JP '997 and JP '099 contain each element of the asserted claims of '529 Patent, with the exception of the "direct current blocking means" and the respective limitations of dependent Claims 2 and 5. Thus, the only relevant questions are whether JP '997 or JP '099 teaches the "direct current blocking means" limitation of independent Claim 1 and the respective limitations of dependent Claims 2 and 5, as they have been construed by the Court or agreed to by the parties.

The dispute between the parties with respect to the "direct current blocking means" of Claim 1 centers on whether the "direct current blocking means," or capacitor(s), in JP '997 and JP '099 are "coupled to the output terminals" within the meaning of the '529 Patent. To address this issue, it is necessary to further construe "direct current blocking means coupled to the output terminals." Dr. Roberts defines "output terminals" as follows:

In the Figures of the '529 Patent, output terminals are shown as nodes (sometimes referred to as terminals or points). On the other hand, a node (or terminal) that simply indicates a connection between two lamps but does not otherwise connect to the device is not an output terminal. In the typical one-lamp configuration, each filament of the lamp is associated with two output terminals (i.e., one set of two output terminals per filament). In most two-lamp configurations, where the lamps are connected in series, the ballast will feature six output terminals (see, e.g., Fig. 3 of the '529 Patent, which shows a set of output terminals on each end [10, 11, and 22, 23], and a set of out terminals in the middle [307 and 308]).

⁶ ULT argues that LBC has conceded that the prior art references teach all limitations of independent Claim 1, except the "direct current blocking means" because Dr. Zane did not discuss any other limitations in his expert report. LBC disputes this contention insofar as ULT argues that they have "conceded" those elements. However, what is clear is that at the summary judgment stage, LBC has come forward with evidence relating only to the "direct current blocking means" and dependent Claims 2 and 5, in response to ULT's contentions and evidence, in Dr. Giesselmann's charts attached to his report, that the prior art references teach every limitation of the asserted claims of the '529 Patent.

Report of Dr. Roberts 28-29. Dr. Zane also agrees with this definition of “output terminals.” *See* Report of Dr. Zane 14. ULT does not express any disagreement. Dr. Roberts also defines “coupled to the output terminals” as follows:

[T]he requirement that the DC blocking means be “coupled to” (i.e. connected to) the output terminals is a requirement that encompasses various types of connections. In the ‘529 Patent, Mr. Bobel speaks of DC blocking circuits that are “connected *across*” the output terminals (see, e.g., Col. 3, ln. 53-55 and the outer sets of output terminals in Figs. 1 and 3) and DC blocking circuits that are “connected *between*” the output terminals (see, eg., Col. 4, ln. 41-44 and the middle set of output terminals in Fig. 3).

Report of Dr. Roberts 32. Again, Dr. Zane agrees with this statement and adopts it in his report. *See* Report of Dr. Zane 14. Likewise, ULT does not express any disagreement. Moreover, both Dr. Roberts and Dr. Zane opine that the ‘529 Patent requires that each set of output terminals be connected to a DC blocking capacitor. *See* Report of Dr. Roberts 32; Report of Dr. Zane 14. Accordingly, for purposes of summary judgment, the Court will adopt these constructions of the “direct current blocking means.”

These additional constructions, in addition to the Court’s construction of the “whenever” clause above, lead to two additional observations. First, the ‘529 Patent does not require that the DC control signal pass through every filament of every lamp. Figure 2 of the ‘529 Patent, for example, discloses two lamps connected in series; the DC control signal does not pass through parallel-connected filaments 213 and 214. Dr. Giesselmann also notes this embodiment in his report. *See* Report of Dr. Giesselmann 16. This observation is consistent with Dr. Roberts’s definition of “output terminals” as not including those terminals where two lamps connect together but do not otherwise connect to the ballast. In Figure 2, terminals x and y are not “output terminals.” Secondly, the ‘529 requires that the DC control signal pass through at least

one filament of each lamp.⁷ With the meaning of the “direct current blocking means” established, the Court may consider ULT’s anticipation arguments.

First, ULT argues that JP ‘997 anticipates Claim 1 because it includes the “direct current blocking means.” Dr. Giesselmann identifies the DC blocking capacitors in JP ‘997 as follows: “When one of the lamps is removed or defective, capacitors C2a and C2b, shown in Figure 1 [of the JP ‘997 Patent], block the flow of DC current through the primary windings of T2 and the choke coils CH1 and CH2.” Report of Dr. Giesselmann 24. ULT asserts that capacitors C2a and C2b and their arrangement in relation to the filaments of respective lamps F1 and F2 satisfy the “direct current blocking means” of Claim 1.

In JP ‘997, the left lead of C2a is coupled to the left filament of F1, the right lead of C2a is coupled to the right filament of F1 through one winding of T2, the left lead of C2b is coupled to the left filament of F2, and the right lead of C2b is coupled to the right filament of F2 via another winding of T2. . . . Dr. Zane . . . admitted during his deposition that JP ‘997 teaches that capacitors C2a and C2b are coupled to each set of output terminals. . . . Dr. Zane said in his report that “Claim 1 requires DC blocking means that accounts for each *set* of output terminals.” . . . Therefore, there is no credible interpretation of claim 1 whereby the claim is not anticipated by JP ‘997.

Pl.’s Reply Br. Supp. Mot. Summ. J. 22, ECF No. 138. Therefore, according to ULT, Claim 1 of the ‘529 Patent is anticipated by JP ‘997.

LBC disputes ULT’s assertion by arguing that JP ‘997 does not include DC blocking circuits accounting for each set of output terminals as required by the ‘529 Patent. According to Dr. Zane:

⁷ If the DC control signal did not pass through at least one filament of each lamp then the ballast would attempt to restrike when a lamp, through which the DC control signal does not pass, is removed from the ballast. The “direct current blocking means” does not allow for this because it requires that the DC control signal be stopped “whenever at least one gas discharge lamp is removed[.]”

JP '997 does not teach "direct current blocking means coupled to the output terminals." To the extent Giesselmann relies on C2a or C2b as "DC blocking means," they are not coupled to each set of output terminals, as required by Claim 1 of the '529 patent. . . . Giesselmann does not specifically identify the output terminals in JP '997 or otherwise cite a portion of the text to support his position; rather, he skips over a discussion of the output terminals and does not attempt to explain how or by what configuration the DC blocking means is allegedly coupled to each set of output terminals.

Report of Dr. Zane 22-23. For this reason, LBC argues, JP '997 does include "direct current blocking means."

Based on the arguments and evidence summarized above, it is clear that the parties closely contest this issue. The evidence indicates that JP '997 includes a capacitor connected in parallel to each lamp. The parties do not dispute that these capacitors, C2a and C2b, are capable of stopping the flow of the controls signal from the DC input terminals whenever the DC control signal path is broken because the lamp is removed from the output terminals or a filament is broken. Dr. Zane, in his deposition, has gone so far as to concede that each capacitor is connected between the output terminals, but noted that the capacitors are parallel to the respective lamps, unlike the embodiments disclosed in the '529 Patent. The Court also notes that the capacitors C2a and C2b are each connected between two sets of output terminals, or between the respective filaments of lamps F1 and F2, in JP '997, rather than each DC blocking capacitor being connected across or between one set of output terminals as disclosed in the '529 Patent.

As the party raising invalidity for anticipation as a defense, ULT carries the burden to prove, by clear and convincing evidence, that JP '997 includes every limitation of the asserted claims. Resolving all doubts and inferences in favor of the non-moving party, and considering that anticipation is ultimately a question of fact, the Court finds that LBC has set forth sufficient evidence to raise a genuine dispute of material fact as to whether JP '997 includes the "direct

current blocking means.” Therefore, summary judgment in favor of ULT on this issue will be denied.⁸

Secondly, ULT argues that JP ‘099 anticipates Claim 1 of the ‘529 Patent because it includes the “direct current blocking means.” According to ULT:

The *only* difference LBC identified between claim 1 of the ‘529 patent and JP ‘099 is that the DC blocking means of JP ‘099 “is coupled only to the output terminals associated with filaments f12 and f21; it is not coupled to the output terminals associated with [filaments] f11 and [f22].” [citation omitted] In other words, the Zane Report interprets claim 1 to require that a separate DC blocking means be provided for each filament. Since it is the function of the DC blocking means to stop the flow of the control signal from the DC input terminals whenever at least one gas discharge lamp is removed from the output terminals or is defective, LBC’s position, as expressed in the Zane Report, is that the control signal must pass through all of the filaments of the lamps (so long as the lamp is not defective).

Def.’s Br. Supp. 46. As indicated, ULT bases its arguments related to the JP ‘099 Patent on a construction of the “direct current blocking means” where a separate DC blocking means must be provided for each filament. ULT argues, that since LBC asserts that a lamp is defective only when the DC control path is broken, then since filaments f11 and f22 are not in the DC control path, JP ‘099 includes the “direct current blocking means” limitation.

Summary judgment in favor of ULT that JP ‘099 anticipates Claim 1 of the ‘529 Patent is inappropriate because the DC blocking capacitor, C12, is not coupled to the outside sets of output terminals, associated with filaments f11 and f22. ULT’s anticipation argument is contrary to the Court’s constructions of the “direct current blocking means” set forth above. Specifically, the “direct current blocking means” does not require that a DC blocking capacitor be coupled to every filament, rather it requires that a capacitor be coupled to each set of output terminals. As

⁸ ULT also contends that JP ‘997 anticipates dependent Claims 2 and 5; however, since the Court has found a question of fact as to whether JP ‘997 includes the “direct current blocking means,” the Court need not address the additional limitations presented by Claims 2 and 5.

Figure 2 of the '529 Patent makes clear, it is possible for the "direct current blocking means" to be coupled to every set of output terminals though not connected to every lamp filament. Points at which two lamps connect to one another but do not otherwise connect to the ballast are not output terminals. Thus, if two filaments are connected in series, in the manner illustrated by Figure 2 of the '529 Patent, those filaments are not connected to output terminals and the DC control current would not pass through them. Therefore, the "direct current blocking means" requires that a DC blocking circuit be coupled to every set of output terminals but not every lamp filament, depending on the configuration at issue. Summary judgment in favor of ULT that JP '099 anticipates Claim 1 of the '529 Patent will be denied.⁹

B. "Voltage Source Means" Limitation

ULT renews its argument that the Court should hold the asserted claims of the '529 Patent invalid as indefinite as a result of the "voltage source means" limitation of Claim 1. The Court has twice addressed this limitation and declines ULT's invitation to address the same issue a third time. ULT presents no additional basis for holding the asserted claims invalid. The Court has previously addressed this issue and hereby adopts and incorporates its prior findings and analysis. *See* Am. Mem. Op. & Order 16-24, December 2, 2010, ECF No. 107. Accordingly, ULT's motion for summary judgment that the asserted claims are invalid as indefinite will be denied.

IV. CONCLUSION

The parties have also filed various objections to certain evidence presented by the opposing party. LBC's objections (ECF No. 134) to the testimony of Dr. Victor Roberts and Dr. Regan Zane are overruled as moot. ULT objects (ECF No. 137) to various new opinions

⁹ ULT also contends that JP'099 anticipates dependent Claims 2 and 5; however, since the Court has found that JP '099 does not include the "direct current blocking means," the Court need not address the additional limitations presented by Claims 2 and 5.

submitted by Dr. Roberts. The Court will sustain this objection to the extent these opinions were not a part of Dr. Roberts's original expert report and that ULT has not had the opportunity to depose Dr. Roberts on these opinions. ULT's remaining objections are overruled as moot. Lastly, the Court will deny LBC's motion for leave to file a sur-reply (ECF No. 141). LBC did not identify any new arguments raised for the first time in ULT's reply brief. Moreover, the evidence attached to ULT's reply brief did not warrant a sur-reply. In any event, LBC's sur-reply went beyond addressing the attachments to ULT's reply brief. Accordingly, LBC's motion for leave to file a sur-reply (ECF No. 141) is **DENIED**.

Consistent with the Court's findings and analysis above, ULT's motion for summary judgment will be granted with respect to any infringement claims related to Claims 3, 4, and 18 of the '529 Patent. ULT's motion will also be granted with respect to infringement of all accused products in Groups 5, 7, 8, and 9. Therefore, ULT's Motion for Summary Judgment or Partial Summary Judgment (ECF No. 127) is hereby **GRANTED, IN PART**, and the remainder is hereby **DENIED**.

SO ORDERED on this **4th** day of **May 2011**.


Reed O'Connor
UNITED STATES DISTRICT JUDGE

excludes Plaintiff's Doctrine of Equivalents theory from the case, several dismissed products in Groups 5 and 8 literally infringe and should remain in the case. *Id.* Defendant also seeks reconsideration and clarification of this Court's May 4, 2011 order. *See* ECF No. 176.

I. FACTUAL & PROCEDURAL BACKGROUND

At issue in this case is United States Patent 5,436, 529 ("529 Patent") issued on July 25, 1995, and entitled "CONTROL AND PROTECTION CIRCUIT FOR ELECTRONIC BALLAST." *See* Summ. J. Order 1, May 4, 2011, ECF No. 172. Plaintiff Lighting Ballast Control, Inc. ("LBC") holds the exclusive right to enforce the '529 Patent. *Id.* The '529 Patent covers a lighting ballast that powers florescent lamps with heatable filaments. *Id.* at 2. An electronic ballast practicing the '529 Patent operates in three different stages: (1) the initial state-up of the ballast, (2) the shut-down or sleep-mode of the ballast, and (3) the re-starting of the ballast after an inoperable lamp has been replaced. *Id.*

LBC instituted this action against Defendant Universal Lighting Technologies, Inc. ("ULT") for infringement of the '529 Patent. *Id.* LBC identifies more than thirty allegedly infringing product schematics. *Id.* ULT has grouped the accused products into fourteen groups on the basis of differences in LBC's infringement analysis, as well as differences in the structure and operation of the accused products. *Id.* On February 25, 2011, ULT moved for summary judgment on the grounds that the accused products did not infringe the '529 Patent and that the '529 patent was invalid as a matter of law. *See* ECF No. 126. On May 4, 2011 the Court granted in part and denied in part ULT's motion for summary judgment. *See* Summ. J. Order 1, May 4, 2011, ECF No. 172. The Court granted ULT's motion with respect to Claims 3, 4, and 18 of the '529 patent and with respect to all products in Groups 5, 7, 8, and 9. *Id.* The Court denied ULT's motion on all other grounds. *Id.*

On May 6, 2011, LBC filed its Emergency Motion for Reconsideration and Clarification. LBC contends that the Court's dismissal of LBC's Doctrine of Equivalents ("DOE") theory from the case was in error because it was based upon an improper reading of LBC's scheduling obligations. *See* Pl.'s Mot. Reconsideration & Clarification 1, ECF No. 173. LBC further contends that even if the Court denies reconsideration of LBC's DOE infringement theory, several products in Groups 5 and 8 literally infringe the '529 patent and therefore should not have been dismissed from the case on the basis of the Court's dismissal of LBC's DOE contentions. *Id.* at 5.

II. LEGAL STANDARD

Rule 54(b) provides that "any order or other decision . . . that adjudicates fewer than all the claims or the rights and liabilities of fewer than all the parties . . . may be revised at any time before entry of" a final judgment. *See* Fed. R. Civ. P. 54(b). "Although the precise standard for evaluating a motion to reconsider under Rule 54(b) is unclear, whether to grant such a motion rests within the discretion of the court." *Dos Santos v. Bell Helicopter Textron, Inc. Dist.*, 651 F. Supp. 2d 550, 553 (N.D. Tex. 2009) (Means, J.). The district court's discretion in this respect is broad. *Calpecto 1981 v. Marshall Exploration, Inc.*, 989 F.2d 1408, 1414-15 (5th Cir. 1993). Such a motion requires the court to determine "whether reconsideration is necessary under the relevant circumstances." *Judicial Watch v. Dep't of the Army*, 446 F. Supp. 2d 112, 123 (D.D.C. 2006) (citation and internal quotation marks omitted). Even though the standard for evaluating a motion to reconsider under Rule 54(b) "would appear to be less exacting than that imposed by Rules 59 and 60 . . . considerations similar to those under Rules 59 and 60 inform the Court's analysis." *Dos Santos*, 651 F. Supp. 2d at 553.

However, "[b]ecause the denial of a motion for summary judgment is an interlocutory order, the trial court is free to reconsider and reverse its decision for any reason it deems sufficient, even

in the absence of new evidence or an intervening change in or clarification of the substantive law.” *Lavespere v. Niagara Mach. & Tool Works, Inc.*, 910 F.2d 167, 185 (5th Cir. 1990), *abrogated on other grounds*, *Little v. Liquid Air Corp.*, 37 F.3d 1069, 1075 n. 14 (5th Cir. 1994) (en banc) (analyzing a Rule 59(e) motion for reconsideration of an order granting a motion for summary judgment).

III. ANALYSIS

LBC seeks reconsideration of this Court’s dismissal of its DOE theory and, in the alternative, clarification from the Court regarding which products should be dismissed from the case on the basis of this Court’s dismissal of LBC’s DOE theory. *See* ECF No. 173.

1. LBC’s Request for Reconsideration

At summary judgment, ULT argued that the Court should strike LBC’s DOE infringement contentions because LBC failed to timely disclose their reliance on the DOE. *See* Summ. J. Order 18, May 4, 2011, ECF No. 172. The Court dismissed LBC’s DOE contentions, holding that LBC “utterly failed to comply with Northern District of Texas Miscellaneous Order No. 62, ¶¶ 3-1, 3-6.” *Id.* Those paragraphs require a party to disclose “specifically and in detail where each element of each asserted claim is found within each accused instrumentality” and “[w]hether each element of each asserted claim is claimed to be literally present or present under the doctrine of equivalents in the accused instrumentality.” *Id.* LBC filed its initial infringement contentions on September 11, 2009. *Id.* at 19. LBC never amended, or sought leave to amend, such infringement contentions. *Id.* LBC’s final infringement contentions were due on or before January 3, 2011, and no extension was every sought or granted. The Court held that LBC failed to request leave to amend their infringement contentions in a timely fashion and failed to show good cause for their delay. *Id.* Accordingly, the Court held that LBC’s DOE infringement contentions should be struck from the

case. *Id.*

LBC now argues, for the first time, that the Court vacated all deadlines under Northern District Miscellaneous Order No. 62 (“Local Patent Rules”), relieving them of any obligation to amend their infringement contentions in a timely fashion. *See* Pl.’s Mot. Reconsideration & Clarification 1-4, ECF No. 173. LBC argues that in subsequent Scheduling Orders the Court vacated any and all deadlines, thus removing the Local Patent Rules from the case and any deadlines for amendment of their infringement contentions. *Id.* Accordingly, LBC contends that this Court dismissed their DOE infringement contentions based upon an “unspoken deadline.” *Id.* at 4.

As LBC notes, the Local Patent Rules are not binding on the Wichita Falls Division of the Northern District of Texas. In its October 16, 2009 Scheduling Order the Court incorporated by reference several portions of the Local Patent Rules, including the above-cited paragraphs governing presentation of the parties’ infringement contentions. *See* ECF No. 49. LBC was required to serve its preliminary infringement contentions on or before October 30, 2009. *Id.* The Court also incorporated by reference ¶¶ 3-6 and 3-7 of the Local Patent Rules, providing that “each party’s preliminary infringement contentions . . . shall be deemed the party’s final contentions” and “[a]ny motion for leave to amend these preliminary contentions must be filed within 30 days of the court’s final claim construction ruling.” *Id.* The Court did not subsequently relieve LBC of the requirement that they serve their preliminary infringement contentions on or before October 30, 2009. Nor did the Court’s subsequent orders eliminate its earlier order that “each party’s preliminary infringement contentions . . . shall be deemed the party’s final contentions.” *Id.* Accordingly, despite the Court’s elimination of future scheduling deadlines, LBC’s preliminary infringement contentions still constituted their final infringement contentions. As such, LBC was still required to amend their preliminary infringement contentions in order to include a DOE infringement contention, which they

failed to do in direct violation of the Court's October 16, 2009 Scheduling Order.

Moreover, LBC completely failed to present this argument to the Court during summary judgment. *See* Pl.'s Resp. Def.'s Mot. Summ. J., ECF No. 135. Instead, as they have done throughout the pendency of this case, LBC responded to ULT's motion as though the relevant sections of the Local Patent Rules applied. *See* Pl.'s Resp. Def.'s Mot. Summ. J., ECF No. 134. Indeed, as ULT notes, LBC informed ULT that they would need to seek leave to amend their invalidity contentions on January 20, 2011, four days before LBC served the expert report they allege constituted service of their final infringement contentions. *See* Def.'s Resp. Pl.'s Mot. Reconsideration & Clarification 8-9, ECF No. 179. LBC now requests that the Court re-interpret their obligations under the Court's October 16, 2009 Order and the Local Patent Rules and excuse their failure to amend their infringement contentions. The Court declines to do so.

Furthermore, not only has LBC misrepresented the state of their obligations under this Court's prior orders, as discussed above, but they waived any such argument by failing to present it during summary judgment. "The Fifth Circuit makes it clear that when a party does not address an issue in his brief to the district court, that failure constitutes a waiver on appeal." *Magee v. Life Ins. Co. of N. Am.*, 261 F. Supp. 2d 738, 748 n. 10 (S.D. Tex. 2003) (citing *Lookingbill v. Cockrell*, 293 F.3d 256, 264 (5th Cir. 2002)). "By analogy, failure to brief an argument in the district court waives that argument in that court." *Id.*; *see also Everest Indem. Ins. Co. v. Allied Int'l Emergency LLC*, No. 4:08-CV-678-Y, 2009 WL 2030421, at *6 (N.D. Tex. July 14, 2009) (Means, J.) ("Defendants do not argue that coverage exists under these provisions in their response. Thus, any argument by Defendants to that effect is waived."). LBC failed to present their instant scheduling argument during summary judgment in response to ULT's motion for summary judgment. As such, LBC has waived this argument.

Accordingly, the Court declines to reconsider its dismissal of LBC's DOE infringement contentions.

2. LBC's Request for Clarification

In the alternative, LBC requests clarification of the Court's May 4, 2011 Order and seeks an opportunity to meet and confer with ULT regarding which products in Groups 5 and 8 infringed solely under DOE and which infringed literally. *See* Pl.'s Mot. Reconsideration & Clarification 5, ECF No. 173. The Court dismissed all products in Groups 5 and 8 from this suit after dismissing LBC's DOE infringement theory from the case. LBC contends that "as ULT is well aware," it claims literal infringement for certain products in Groups 5 and 8.

LBC argues that their expert reports illustrate their plan to proceed on a theory of literal infringement for several products in Groups 5 and 8 and requests an opportunity to meet and confer with ULT to identify those products. ULT responds that the Court's May 4, 2011 Order does not require clarification because LBC disclosed only a DOE infringement theory for the products in Groups 5, 8, and 9. *See* Def.'s Resp. Pl.'s Mot. Reconsideration & Clarification 10, ECF No. 179. Specifically, ULT contends that Dr. Roberts' Expert Report does not disclose a literal theory of infringement for products in Groups 5, 8, and 9. *Id.* at 11. The Court finds ULT's reading of Dr. Roberts' report strained, at best. As noted by LBC, it is clear that when Dr. Roberts states "Yes" it indicates that a product literally infringes. This conclusion is bolstered by Dr. Roberts' further statement that certain products "also" infringe under DOE. The clear import of Dr. Roberts' Expert Report is that several of the products in Groups 5 and 8 were alleged to infringe under both a literal theory of infringement and under DOE.

Accordingly, the Court finds that LBC's request for clarification regarding the dismissal of

certain products in Groups 5 and 8 is well taken.

3. ULT's Request for Reconsideration

Defendant ULT seeks reconsideration of this Court's May 4, 2011 Order construing the term "direct current blocking means" and denying ULT's motion for summary judgment on the grounds that the '529 Patent is anticipated as a matter of law. The Court declines ULT's invitation to reconsider its prior Order.

IV. CONCLUSION

Accordingly, the Court finds that Plaintiff LBC's Motion for Reconsideration and Clarification should be **GRANTED** in part and **DENIED** in part. It is therefore **ORDERED** that Plaintiff LBC's request that the Court reconsider order dismissing LBC's DOE infringement contentions is **DENIED**.

It is further **ORDERED** that the parties must file a joint status report on the docket on or before **Wednesday, June 1, 2011**, identifying those products in Groups 5 and 8 for which LBC has alleged a claim of literal infringement.

It is further **ORDERED** that the parties must file a joint status report on the docket on or before **Friday, June 3, 2011**, identifying and listing all products for which LBC has alleged a claim of literal infringement.

Finally, it is further **ORDERED** that Defendant ULT's Motion for Reconsideration should be and is hereby **DENIED**.

SO ORDERED on this **25th** day of **May, 2011**.


Reed O'Connor
UNITED STATES DISTRICT JUDGE

At issue in this case is United States Patent 5,436,529 (“‘529 Patent”) issued on July 25, 1995, and entitled “CONTROL AND PROTECTION CIRCUIT FOR ELECTRONIC BALLAST.” *See* Summ. J. Order 1, May 4, 2011, ECF No. 172. Plaintiff LBC holds the exclusive right to enforce the ‘529 Patent. *Id.* The ‘529 Patent covers a lighting ballast that powers fluorescent lamps with heatable filaments. *Id.* at 2. An electronic ballast practicing the ‘529 Patent operates in three different stages: (1) the initial start-up of the ballast, (2) the shut-down or sleep-mode of the ballast, and (3) the re-starting of the ballast after an inoperable lamp has been replaced. *Id.*

LBC instituted this action against ULT for infringement of the ‘529 Patent on February 24, 2009. *Id.* This case was tried to a jury on LBC’s contention that 46 of ULT’s lighting ballast products literally infringe claims 1, 2 and 5 of the ‘529 patent during the week of June 13, 2011. *See* ECF No. 226. After the close of LBC’s case, and again at the close of the evidence, ULT moved from entry of Judgment as a Matter of Law on the basis of non-infringement and invalidity pursuant to Rule 50(a) of the Federal Rules of Civil Procedure. The Court denied these motions.

On June 17, 2011, the jury returned a verdict finding: 1) all seven ULT product groups infringed claims 1, 2 and 5 of the ‘529 patent; 2) the asserted claims were not invalid as anticipated; 3) that there was no willful infringement; and 4) awarding “3,000,000.00” in damages to LBC. *See* Jury Charge 24-27, ECF No. 241. On June 27, 2011, in accord with the Court’s June 18, 2011 Order, LBC filed a motion for entry of judgment seeking: 1) an award of prejudgment and post-judgment interest and entry of the \$3,000,000.00 damages award; 2) a finding that this is an exceptional case under 35 U.S.C. § 285 on the basis of ULT’s litigation misconduct, justifying an award of attorney’s fees; 3) a permanent injunction barring ULT from continuing to infringe claims 1, 2 and 5 of the ‘529 patent; and 4) a declaration stating that the ‘529 patent is infringed and valid.

See LBC's Mot. Entry J.1, ECF No. 244.

On the same day, pursuant to the Court's June 18, 2011 Order and Rule 50 of the Federal Rules of Civil Procedure, ULT moved for Judgment as a Matter of Law on seven grounds: 1) the record does not contain legally sufficient evidence that the accused ULT products met the "output terminals connected to" limitation of claim 1 of the '529 patent; 2) the record does not contain legally sufficient evidence that the accused ULT products met the "control means" limitation of the '529 patent; 3) the record does not contain legally sufficient evidence that the accused products met the "direct current block means" limitation of the '529 patent; 4) the record does not contain legally sufficient evidence that the Linear Group 3 products infringe the '529 patent; 5) LBC failed to rebut the uncontested evidence that the '529 patent is invalid as anticipated by Japanese patent applications '799 and '997; 6) the record does not contain sufficient evidence to show compliance with the marking requirements of 35 U.S.C. § 284; and 7) based on the record evidence, the Court should clarify that the damages award represents a lump sum reasonable royalty award. See ULT's Mot. J. as a Matter of Law ("JMOL") 1-2, ECF No. 246.

II. LEGAL STANDARD

Rule 50 of the Federal Rules of Civil Procedure governs motions for judgment as a matter of law in jury trials. See Fed. R. Civ. P. 50; see also *Weisgram v. Marley Co.*, 528 U.S. 440, 448-49 (2000). A motion for judgment as a matter of law "is not a patent-law-specific issue, so regional circuit law applies." *Harris Corp. v. Ericsson Inc.*, 417 F.3d 1241, 1248 (Fed. Cir. 2005). Rule 50(a) "authorizes the entry of judgment as a matter of law '[i]f a party has been fully heard on an issue during a jury trial and the court finds that a reasonable jury would not have a legally sufficient evidentiary basis to find for the party on that issue.'" See *James v. Harris Cnty.*, 577 F.3d 612, 617

(5th Cir. 2009) (quoting Fed. R. Civ. P. 50(a)). “It allows the trial court to remove cases or issues from the jury’s consideration ‘when the facts are sufficiently clear that the law requires a particular result.’” *Weisgram*, 528 U.S. at 448 (quoting 9 Wright & Miller § 2521). “If the court does not grant a motion for judgment as a matter of law made under Rule 50(a), the court is considered to have submitted the action to the jury subject to the court’s later deciding the legal questions raised by the motion.” Fed. R. Civ. P. 50(b).

“[I]n entertaining a motion for judgment as a matter of law, the court should review all of the evidence in the record.” *Reeves*, 530 U.S. at 150. “In doing so, however, the court must draw all reasonable inferences in favor of the nonmoving party, and it may not make credibility determinations or weigh the evidence.” *Id.* (citing *Lytle v. Household Mfg., Inc.*, 494 U.S. 545, 554-55 (1990)). “‘Credibility determinations, the weighing of the evidence, and the drawing of legitimate inferences from the facts are jury functions, not those of a judge.’” *Id.* at 150-51 (quoting *Anderson v. Liberty Lobby*, 477 U.S. 242, 255 (1986)). “Thus, although the court should review the record as a whole, it must disregard all evidence favorable to the moving party that the jury is not required to believe.” *Id.* at 151.

“A motion for judgment as a matter of law is appropriate if, after considering the evidence presented and viewing all reasonable inferences in the light most favorable to the nomovant, the facts and inferences point so strongly in favor of the movant that a rational jury could not arrive at a contrary verdict.” *Murray v. Red Kap Indus., Inc.*, 124 F.3d 695, 697 (5th Cir. 1997). The Court must determine “whether ‘the facts and inferences point so strongly and overwhelmingly in favor of one party that the court concludes that reasonable jurors could not arrive at a contrary verdict.’” *Harris Corp.*, 417 F.3d at 1248 (quoting *Bellows v. Amoco Oil Co.*, 118 F.3d 268, 273 (5th Cir.

1997)). “If there is substantial evidence of such quality and weight that reasonable and fair-minded jurors might reach a different conclusion” then judgment as a matter of law is not appropriate. *Id.* “We must remember, however, that evidence sufficient to support a jury verdict must be *substantial* evidence.” *Guile v. United States*, 422 F.3d 221, 227 (5th Cir. 2005). “[T]he party opposing the motion must at least establish a conflict in substantial evidence on each essential element of their claim.” *See Anthony v. Chevron USA, Inc.*, 284 F.3d 578, 583 (5th Cir. 2002) (citing *Boeing Co. v. Shipman*, 411 F.2d 365, 374 (5th Cir. 1969) (en banc)). “The ‘standard of review with respect to a jury verdict is especially deferential.’” *Lubke v. City of Arlington*, 455 F.3d 489, 494 (5th Cir. 2006) (quoting *Brown v. Bryan Cnty.*, 219 F.3d 450, 456 (5th Cir. 2000)).

III. MOTION FOR JUDGMENT AS A MATTER OF LAW

The Court will first consider ULT’s Motion for Judgment as a Matter of Law, and then consider LBC’s Motion for Entry of Judgment.

ULT moves for judgment as a matter of law on seven grounds: 1) the record does not contain legally sufficient evidence that the accused ULT products meet the “output terminals connected to” limitation of claim 1 of the ‘529 patent; 2) the record does not contain legally sufficient evidence that the accused ULT products meet the “control means” limitation of the ‘529 patent; 3) the record does not contain legally sufficient evidence that the accused products meet the “direct current block means” limitation of the ‘529 patent; 4) the record does not contain legally sufficient evidence that the Linear Group 3 products infringe the ‘529 patent; 5) LBC failed to rebut the uncontested evidence that the ‘529 patent is invalid as anticipated by Japanese patent applications ‘799 and ‘997; 6) the record does not contain legally sufficient evidence that LBC complied with the marking requirements of 35 U.S.C. § 284; and 7) based on the record evidence, the Court should clarify that

the damages award represents a lump sum royalty payment. *See* ULT's JMOL 1-2, ECF No. 246.

A. "Connected to" Limitation

ULT contends that LBC failed to present legally sufficient evidence that the accused products meet the "output terminals connected to" limitation of claim 1 because the products are merely capable of being connected to a gas discharge lamp, but are not actually so connected. *See* Br. Supp. ULT's JMOL 1-3, ECF No. 246. ULT further contends that the verdict cannot be sustained on the basis of LBC's untimely attempt to re-construe "connected to" to mean "for connection to," because LBC waived their construction argument by failing to present it until after trial is incorrect as a matter of law. *Id.* at 3-8. LBC responds that ULT is the party proposing a new construction of the "connected to" language of claim 1, as both parties and the Court have consistently used the term "connected to" as interchangeable with the "for connection to" language of claim 18. *See* LBC's Resp. ULT's JMOL 2-11, ECF No. 247. LBC further argues that, regardless of ULT's waiver, ULT's proposed construction is incorrect as a matter of law. *Id.*

Preliminarily, both parties contend that their adversaries are proposing novel construction arguments. As such, both parties argue that their rivals have waived their proposed constructions. "Although waiver is generally a procedural issue, this court applies Federal Circuit precedent when determining whether a claim construction argument has been waived." *Lazare Kaplan Int'l, Inc. v. Photoscribe Techs. Inc.*, 628 F.3d 1359, 1376 (Fed. Cir. 2010) (citing *Harris Corp.*, 417 F.3d at 1250-51). "[L]itigants waive their right to present new claim construction disputes if they are raised for the first time after trial." *Broadcom Corp. v. Qualcomm Inc.*, 543 F.3d 683, 694 (Fed. Cir. 2008) (quoting *Conoco, Inc. v. Energy & Envtl. Int'l, L.C.*, 460 F.3d 1349, 1358-59 (Fed. Cir. 2006)).

ULT contends that at trial, and in its trial brief, LBC attempted to justify a finding of infringement by arguing for the first time that claim 1's "connected to" language should be construed to mean "for connection to," thus relieving LBC of the burden of proving that ULT actually connects its accused ballasts to lamps. *See* Br. Supp. ULT's JMOL 3, ECF No. 246. ULT contends that such a construction should have been presented to the Court rather than argued to the jury. *Id.* at 3-4. ULT further contends that LBC waived the right to proffer such a construction by not requesting a construction from the Court before the close of trial. *Id.* LBC contends that ULT's argument to the jury at trial that "connected to" and "for connection to" are not interchangeable represents a last-minute attempt to re-construe the term at odds with ULT's earlier claim construction position. LBC's Resp. ULT's JMOL 3-4, ECF No. 247. Accordingly, LBC contends that ULT waived any argument that the output terminals of the ballast must be physically connected to the lamp to meet the "connected to" language of claim 1. *Id.*

ULT's position rests on the intuitively enticing argument that because the "connected to" language of claim 1 was never "specially construed," such language retained its "plain meaning." *See* ULT's Reply 2-3, ECF No. 252. According to ULT, "arguing that words in a claim should be given a specialized or non-ordinary meaning is *proposing* a claim construction." *Id.* at 2. ULT's contention that no "specialized construction" of the term was necessary because they only sought to rely on the "plain meaning" of the language in claim 1 ignores the fact that in patent cases, "the ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc).

In fact, both parties implicitly proposed new claim construction arguments during the course

of trial. ULT argued for the first time that the accused products did not meet claim 1 of the '529 patent because ULT did not literally connect their ballasts to lamps. Implicit in such argument to the jury was a construction holding that "connected to" required actual physical connection, a construction at odds with most of the parties' prior briefing on the issue. Similarly, LBC argued to the jury through their expert Dr. Roberts that the term "connected to" in the '529 patent should be understood to mean "for connection to." When LBC filed its trial brief regarding construction of the "connected to" language, ULT responded by arguing that *Cross Medical Products, Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293 (Fed. Cir. 2005), controlled and required the Court to construe the term "connected to" to require actual physical connection. Despite such clearly dueling constructions, neither party requested that the Court construe the term. Rather, both parties continued to argue their respective constructions to the jury, waiving their right to request such constructions through post-judgment motions.

Problematically, given the extant evidence regarding ULT's patents and the construction arguments counsel for both ULT and LBC made to the jury, the jury was required to construe the term "connected to" to mean "for connection to" in order to find infringement because mere capability is insufficient to support a finding of infringement. *See, e.g. Ball Aerosol & Specialty Container, Inc. v. Ltd. Brands, Inc.*, 555 F.3d 984, 994-95 (Fed. Cir. 2009). In order to directly infringe a patent "an accused infringer must either practice every element or control or direct the actions of another that practices the element in question." *Centillion Data Sys., LLC v. Quest Commc'n Int'l, Inc.*, 631 F.3d 1279, 1282 (Fed. Cir. 2010). In *Ball Aerosol*, the "district court found infringement because the accused [device] 'is reasonably capable of being configured in such a way that its holder [meets the relevant claim limitation].'" *Ball Aerosol*, 555 F.3d at 994. The Federal

Circuit reversed, holding that the plaintiff's "reliance on cases that found infringement by accused products that were reasonably capable of operating in an infringing manner is misplaced, since that line of cases is relevant only to claim language that specifies that the claim is drawn to capability." *Id.* (citing *Fantasy Sports Props., Inc. v. Sportsline.com, Inc.*, 287 F.3d 1108, 1117-18 (Fed. Cir. 2002)). *Ball Aerosol* teaches that unless the claim language is drawn to capability, a plaintiff must prove "specific instances of direct infringement or that the accused device necessarily infringes the patent in suit." *Id.* (quoting *ACCO Brands, Inc. v. ABA Locks Mfg. Co.*, 501 F.3d 1307, 1313 (Fed. Cir. 2007)). In the instant case, the claim language "connected to" is not drawn to capability. Accordingly, the jury verdict cannot be upheld by resort to argument that the accused products are "reasonably capable" of being connected to gas discharge lamps. *Cf. id.* For the jury's verdict to be reasonable necessitates a finding that the jury appropriately construed the term "connected to" to mean "for connection to," because there is legally insufficient evidence that ULT actually connected the accused lighting ballasts to gas discharge lamps.

However, as ULT rightly notes, claim construction is a matter of law reserved for the Court to decide. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970-71 (Fed. Cir. 1995) (en banc) ("[T]he interpretation and construction of patent claims, which define the scope of the patentee's rights under the patent, is a matter of law exclusively for the court."). Therefore, despite the fact that both parties waived their respective claim construction arguments, the Court must now construe the "connected to" language of claim 1 in order to evaluate the verdict. *Id.*

Claim construction is the process of giving proper meaning to the claim language thereby defining the scope of the protection. *See Bell Commc 'ns Research, Inc. v. Vitalink Commc 'ns Corp.*, 55 F.3d 615, 619 (Fed. Cir. 1995) (internal citations omitted). Claim construction starts with the

language of the claim itself since a patent's claims define the invention to which the patentee is entitled the right to exclude. *Phillips*, 415 F.3d at 1312. "[T]he words of a claim 'are generally given their ordinary and customary meaning.'" *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1982)). "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Id.* However, the patentee is free to define his own terms, so long as any special definition given to a term is clearly defined in the specification. *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1388 (Fed. Cir. 1992). "The claims themselves provide substantial guidance as to the meaning of particular claim terms." *Phillips*, 415 F.3d at 1314.

When construing disputed claim terms the court should look first to the intrinsic record of the patent, including the claims and the specification, to determine the meaning of words in the claims. *Nazomi Commc'ns., Inc. v. Arm Holdings, PLC*, 403 F.3d 1346, 1368 (Fed. Cir. 2005). "We first look to the specification for guidance as to the meaning of claim language." *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1306 (Fed. Cir. 2006). "The specification is always highly relevant to the claim construction analysis. Usually it is dispositive; it is the single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1315. The specification acts as a dictionary when it expressly or implicitly defines terms. *Id.* at 1321. Courts should also refer to the prosecution history if it is in evidence. *Vitronics Corp.*, 90 F.3d at 1582. The prosecution history is part of the intrinsic record and consists of a complete record of all proceedings before the United States Patent and Trademark Office, including prior art cited during the examination of the patent, and express representations made by the applicant as to the scope of the claims. *Phillips*, 415 F.3d at 1321.

The Federal Circuit has also stated that district courts may "rely on extrinsic evidence, which

consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” *Id.* (internal quotations omitted). Dictionaries and treatises can be “useful in claim construction[,]” particularly technical dictionaries which may help the court “to better understand the underlying technology and the way in which one of skill in the art might use the claim terms.” *Id.* at 1318 (internal quotations omitted). As to expert testimony, the Federal Circuit has stated:

[E]xtrinsic evidence in the form of expert testimony can be useful to a court for a variety of purposes, such as to provide background on the technology at issue, to explain how an invention works, to ensure that the court’s understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field.

Id. However, “a court should discount any expert testimony that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent.” *Id.* (internal quotations omitted). Extrinsic evidence is less significant than the intrinsic record and undue reliance on it may pose a risk of changing the meaning of claims, contrary to the public record contained in the written patent. *Id.* at 1317, 1319.

ULT argues that the claim language, specification, prosecution history, and extrinsic evidence together illustrate that one skilled in the art would construe “connected to” in claim 1 to require actual physical connection. *See* Br. Supp. ULT’s JMOL 5-8, ECF No. 246. Looking first to the claim language, ULT argues that the Federal Circuit has consistently construed “connected to” to mean joined together. *Id.* at 5. ULT argues that such a construction is supported by the intrinsic record of the patent, because the language of claim 18 provides for “output terminals for

connection to” the filaments of gas discharge lamps, in direct contrast to the language of claim 1. *Id.* As ULT notes, “[w]hen different words or phrases are used in separate claims, a difference in meanings is presumed.” *Nystrom v. Trex. Co.*, 424 F.3d 1136, 1143 (Fed. Cir. 2005). “However, simply noting the difference in the use of claim language does not end the matter. Different terms or phrases in separate claims may be construed to cover the same subject matter where the written description and prosecution history indicate that such a reading of the terms or phrases is proper.” *Id.*

ULT argues that short of overcoming the presumption, the specification and prosecution history underscore that the “connected to” limitation in claim 1 should not be construed to cover the same subject matter as the “for connection to” language in claim 18. ULT contends that the specification supports the “plain” meaning of “connected to” because every preferred embodiment shows a ballast actually connected to a lamp and because the term “connected to” is used in the specification to refer to actual physical connection. Br. Supp. ULT’s JMOL 6, ECF No. 246. Moreover, ULT argues that the prosecution history supports such an understanding because the inventor, Andrew Bobel, changed the language of claim 1 from “for connection to” to “connected to” in response to the Patent and Trade Office’s (“PTO”) initial rejection of the ‘529 patent. *Id.*

LBC responds that ULT is ignoring the Federal Circuit’s admonishment that claims terms must be given their ordinary meaning as understood by one skilled in the art in the context of the entire patent, rather than their ordinary meaning in a vacuum. *See* LBC’s Resp. ULT’s JMOL 4, ECF No. 247. LBC then cites the testimony of both Dr. Roberts, their infringement expert, and Dr. Giesselmann, ULT’s invalidity expert. *Id.* at 5. Looking to the intrinsic evidence of the ‘529 patent, LBC argues that the patent’s reference to the claimed invention as an “electronic ballast” strongly

supports a construction that does not require actual physical connection to a lamp. *Id.* at 6. Moreover, LBC contends that the patent's statement that each embodiment represents a circuit "for powering" or "adapted to power" a lamp illustrates that the intrinsic record supports construing "connected to" as interchangeable with "for connection to." *Id.* at 6-7.

In relevant part, claim 1 of the '529 patent provides for "an energy conversion device . . . comprising [*inter alia*] output terminals connected to the filaments of the gas discharge lamp." In contrast, claim 18 of the '529 patent provides for "output terminals for connection to the filaments of the gas discharge lamp." Given the difference in language, the Court must presume that the inventor meant something different absent strong evidence to the contrary. *Cf. Nystrom*, 424 F.3d at 1143. As discussed below, however, the Court finds that both the intrinsic and extrinsic record strongly support construing the "connected to" language of claim 1 as covering the same subject matter as the "for connection to" language of claim 18. Throughout the patent, Bobel described the claimed invention as an "electronic ballast," explicitly describing the entire invention as a "control and protection circuit for [an] electronic ballast." *See* App. Supp. ULT's JMOL 330, ECF No. 248. Describing the background of his invention, Bobel evaluates a series of circuit patterns used in the electronic ballast industry over the prior decades, before concluding that "it is highly desirable to have a series-resonant ballast for gas discharge lamps." *Id.* At the close of his summary of the invention, Bobel once again states that "[i]t will be understood that such a device as outlined above will provide a series-resonant ballast for gas discharge lamps." *Id.* Accordingly, Bobel consistently referred to his invention in the intrinsic record of the '529 patent as an electronic ballast, with the main novelty being the control and protection circuit in the ballast described in further detail later in the specification. This self-description of the claimed invention as a control circuit for an

electronic ballast raises a strong presumption that any claim construction must accord with the inventor's specifically claimed invention. "The construction that stays true to the claim language and most naturally aligns with the *patent's description of the invention* will be, in the end, the correct construction." *Nystrom*, 424 F.3d at 1142 (quoting *Phillips*, 415 F.3d at 1316) (emphasis added).

Looking further into the specification, the corresponding structure for the three series current paths described in columns 3 and 4, and described in further detail in columns 7 and 8 of the patent, strongly support construing the term "connected to" as identical to "for connection to." Specifically, the specification's description of Mode B contemplates the ballast as operational in the absence of a gas discharge lamp physically connected to the ballast's output terminals. *See App. Supp. ULT's JMOL 333, ECF No. 248.* "While the device is operational as in Mode A, if the fluorescent lamp is removed out of its holder . . . the transistor turns OFF the device and the oscillations cease." *Id.* The fact that the patent's specification, describing the "details of operation" of the first preferred embodiment of the patent (which represents, per the agreement of the parties, the classic function of the '529 patent according to claim 1), specifically describes the functioning of the ballast when there is no gas discharge lamp connected to the output terminals strongly supports LBC's construction. *Id.* Moreover, such description further bolsters Andrew Bobel's opening claim that the '529 patent claims an invention for a "control and protection circuit for an electronic ballast."

Turning to the prosecution history, the Court agrees with LBC that Bobel's change in the language of claim 1 does not necessarily or clearly constitute a substantive amendment to the claim language meant to alter the claim or to differentiate claim 1 from claim 18. *See LBC's Resp. ULT's JMOL 7-8, ECF No. 247.* ULT states that in response to a PTO rejection of the '529 patent, Bobel

changed the language in claim 1. *See* ULT's JMOL 6, ECF No 246. Since he simultaneously added claim 18, using the "for connection to" language, ULT argues that Bobel "clearly understood . . . that 'connected to' and 'for connection to' have different meaning." *Id.* Such correlation, while superficially reasonable, does not stand up to scrutiny given the nature and import of the PTO's action rejecting the '529 patent. As LBC notes, the PTO action rejected claim 1 as anticipated by Zuchriegel. LBC's Resp. ULT's JMOL 8, ECF No. 247. Bobel responded by arguing that his particular arrangement of "control means" and "direct current blocking means" differentiated the '529 from the prior art reference. *Id.* In essence, Bobel essentially conceded that the output terminals claim limitation did not represent a novel claim, relying on different elements of claim 1. *Id.* Given that the PTO's action, and Bobel's subsequent response, ignore the output terminals claim limitation, it would be mere speculation to endow the change with any importance. Indeed, LBC's suggestion that Bobel "simply parroted" the PTO is just as likely, if not more likely, than ULT's strained reading of the change. As such, the Court finds that the prosecution history does not provide any evidence in support of either party's construction position.

Lastly, the Court turns to the expert testimony adduced by the parties at trial as they crafted their claim construction arguments for the jury. LBC's infringement expert, Dr. Roberts, testified that he found ULT's proposed construction "nonsensical" in light of the text and purpose of the patent, and strongly advocated construing "connected to" as interchangeable with "for connection to." *See* App. Supp. LBC's Resp. ULT's JMOL 11, ECF No. 248. On cross-examination, ULT's invalidity expert Dr. Giesselmann essentially agreed, responding "Yes" when counsel for LBC asked him if he had "used the words connect to and for connection to . . . interchangeably." *Id.* at 242-43. In contrast, Mr. Burke, ULT's infringement expert, testified that he understood the term "connected

to” to mean “connected to.” *See* App. Supp. ULT’s JMOL 221, ECF No. 246. Moreover, ULT argues that Dr. Giesselmann’s statement is taken out of context, noting that he used the terms interchangeably for the purposes of his invalidity analysis because the prior art references showed a ballast connected to lamps, and because at the time of his report claim 18 was still being asserted in this suit. *See* Br. Supp. ULT’s JMOL 7-8, ECF No. 246.

As discussed *supra*, extrinsic evidence, especially expert testimony adduced a trial, is one of the least reliable evidentiary sources for claim construction purposes. *Cf. Phillips*, 415 F.3d at 1317-19. Nonetheless, despite ULT’s arguments to the contrary, it is telling that both Dr. Roberts and Dr. Giesselmann agreed that the terms “connected to” and “for connection to” should be used interchangeably. While true that Dr. Giesselmann’s report and testimony was directed towards ULT’s invalidity arguments, Dr. Giesselmann nonetheless did agree with Dr. Roberts that the term should be construed interchangeably. Of greater importance, the expert opinions of Dr. Roberts and Dr. Giesselmann accord with the specification and the inventor’s own description of the invention. Given the inventor’s description of the patent’s invention as a circuit for an electronic ballast, the fact that the specification contemplates removal of a lamp during operation of claim 1, and the expert evidence adduced at trial, the Court finds that one skilled in the art would understand “connected to” in claim 1 of the ‘529 patent as meaning “for connection to.”

Given such construction, the Court finds that there was sufficient evidence adduced at trial that the accused ULT products have “output terminals for connection to” a gas discharge lamp.

2. “Control Means” Limitation

ULT moves for judgment as a matter of law on the grounds that LBC failed to present legally sufficient evidence that the accused products infringe the “control means” limitation of the asserted

claims. *See* Br. Supp. ULT's JMOL 8, ECF No. 246. ULT argues that the evidence is insufficient as a matter of law on three grounds: 1) Dr. Roberts' testimony on equivalent structure was conclusory and insufficient as a matter of law under Federal Circuit precedent; 2) no reasonable jury could have concluded that the differences between control circuit 58 and the accused products are insubstantial in light of the undisputed differences; and 3) the evidence was clear that the structures used in the accused products were not available at the time the '529 patent issued.

The parties agreed during claim construction that the "control means" element of claim 1 should be construed according to section 112, ¶6 as a means-plus-function claim term. *See* Am. Claim Construction Order 24, ECF No. 107. In the Jury Charge, the Court explained that the "control means" requirement of the '529 patent recites four functions:

(1) control means

- (a) capable of receiving a control signal from the DC input terminals and;
- (b) operable to effectively initiate oscillations, and;

(2) control means

- (a) capable of receiving a control signal from the resonant converter, and;
- (b) operable to effectively stop the oscillations.

See Jury Charge 8, ECF No. 241. The Court further explained that the "corresponding structure for the 'control means' requirement is the control circuit (58) described at column 3, line 59 through column 4, line 21 of the '529 Patent." *Id.* At column 3, line 59 through column 4, line 21 the patent describes a series of discrete electrical components arrayed in a specific configuration to form three series current paths to fulfill the function of starting and stopping the oscillations of the resonant converter. *See* App. Supp. ULT's JMOL 331, ECF No. 246.

As ULT notes, LBC does not allege that any of the accused products have a structure identical to the corresponding structure described in the specification of the '529 patent. *See* Br. Supp ULT's JMOL 8, ECF No. 246. Rather, LBC argued (and the jury agreed), that the accused products have an equivalent structure to the control circuit 58 of the '529 patent. "For a means-plus-function claim term, the term literally covers an accused device if the relevant structure in the accused device performs the identical function recited in the claim and that structure is identical to or equivalent to the corresponding structure in the specification." *Intellectual Science & Tech., Inc. v. Sony Elecs., Inc.*, 589 F.3d 1179, 1183 (Fed. Cir. 2009) (citing *Welker Bearing Co. v. PHD, Inc.*, 550 F.3d 1090, 1099 (Fed. Cir. 2008)). However, a merely conclusory expert opinion is insufficient evidence to justify a finding of equivalence. *Id.* at 1181-86.

ULT predominantly relies on *Intellectual Science* for the proposition that Dr. Roberts testimony in the instant case is conclusory and insufficient as a matter of law. *See* Br. Supp. ULT's JMOL 8-12, ECF No. 246. In *Intellectual Science*, the Federal Circuit reviewed the conclusions of a special master and district court that an expert's infringement opinion was insufficient to create a genuine issue of material fact for the purposes of summary judgment. *Intellectual Science*, 589 F.3d at 1182-83. The special master identified a structure including four elements and recommended granting summary judgment in favor of non-infringement because the Plaintiff's expert report was "merely conclusory." *Id.* at 1183. According to the special master, the expert report did "not annotate the circuit diagrams upon which [the expert] relie[d]," nor did the report identify a "specific structure" that infringed. *Id.* On appeal, the Federal Circuit held that the report did "not sufficiently identify the structural elements of the claims 'data transmitting means.'" *Id.* at 1184. Specifically, the report at issue in *Intellectual Science* did not pinpoint the structures that performed the claimed

functions, thus failing to show an “infringing structure.” *Id.* Rather, using a diagram without descriptions, the expert report presented “an unexplained array of electronic symbols.” *Id.* The court held that “[e]ven if the elements are common components, the record must specifically identify the infringing features of those components and the reason that one of skill in the art would recognize them as infringing. Without further identification and explanation, a reasonable juror would not be able to determine that those allegedly infringing components are actually present.” *Id.* The expert’s report also required several logical leaps and illogical inferences, resulting from “opaque” identifications. *Id.* The report then concluded, without explanation, that the accused devices performed the same function, in the same way, to achieve the same result. *Id.* at 1185. The Federal Circuit held that conclusory statement “insufficient.” *Id.*

The extensive testimony Dr. Roberts gave on the issue of equivalence on direct and during cross-examination and re-direct is clearly distinguishable from the perfunctory expert report at issue in *Intellectual Science*. Dr. Roberts first identified and explained the structure and function of control circuit 58, and explained in detail the manner in which control circuit 58 operates in the ‘529 patent. *See* App. Supp. LBC’s Resp. ULT’s JMOL 24-26, ECF No. 248. Having detailed the structure, function and operation of the control circuit, Dr. Roberts proceeded to explain the structure of the accused products and why such structures were equivalent for infringement purposes. Dr. Roberts, using schematics in open court, was first asked to identify and highlight the control circuitry found in the Linear Group 1 products. *See* App. Supp. ULT’s JMOL 26, ECF No. 246. Dr. Roberts identified where the DC enters the control means, before testifying that the accused products perform the first function of the ‘529 patent control means of receiving a control signal from the DC input terminals. *Id.* at 26-27. Next, Dr. Roberts testified that the accused

products satisfy the second function of the control means limitation, stating that it initiates oscillations. *Id.* at 27. Of greater import for the instant inquiry, however, Dr. Roberts also explained how the accused product performs the relevant function stating: “The signal flows down through these resistors[,] through these discreet transistors and eventually over the integrated circuit only into a pin labeled EN2[,] which enables oscillations.” *Id.*

Dr. Roberts then proceeded to elaborate, explaining that the integrated circuit (“IC”) used in the accused products constitutes “a large collection of semiconductor parts on a single piece of silicone, and they are put together for specific purposes to do advanced functions. So instead of having a hundred separate transistors and resistors, you grow them all on one small silicone chip.” *Id.* at 28. Dr. Roberts explained that despite the various functions performed by an IC, “you are still limited to a certain number of pins on the package which are electrical connections.” *Id.* Dr. Roberts further explained that in the accused products, the IC “comprises only a portion of the control circuit” because “there are a number of discreet electrical components outside of the [IC] that are part of the control circuit.” Dr. Roberts emphasized that “it is these parts that bear the really close similarity to [the control means] in the ‘529 patent.” *Id.* at 29. Dr. Roberts concluded by issuing the series of conclusory equivalence statements highlighted by ULT in their brief. *Id.* at 30-32. However, in the context of Dr. Roberts’ testimony as a whole, such conclusions stemmed naturally from his analysis, description, and explanation of the structure and operation of the accused products. As such, ULT’s recitation of Dr. Roberts’ testimony on direct examination ignores the context in which his superficially conclusory remarks appear.

Dr. Roberts further expounded on his equivalency analysis on cross-examination, explaining the function of the zener diode in several accused products as equivalent to the diac used in the ‘529

patent. *See* App. Supp. LBC's Resp. ULT's JMOL 122-25. Dr. Roberts described the manner in which, looking to both the schematics of the ULT products and ULT's '652 patent, one could see how the zener diode performed the exact same function as the diac in the '529 patent. *Id.* Indeed, as Dr. Roberts often noted, the '652 patent describes the zener diode as an "equivalent" of a diac. *Id.* Through the course of his testimony, Dr. Roberts carefully explained the reasoning behind his conclusions, replete with discussion of the functions performed by the accused products and the structures that perform those functions. Of greater import, Dr. Roberts compared the manner in which the structures in the accused products worked with the way the corresponding structures of the control means in the '529 patent would operate, proffering exhaustive explanations of their similarities.

Accordingly, the Court finds that Dr. Roberts' testimony is entirely distinguishable from the perfunctory analysis at issue in *Intellectual Science*. In *Intellectual Science* the expert report did not label the schematics at issue, did not detail the corresponding structures in the accused products allegedly performing the claimed functions of the patent, and did not show how such structures would accomplish the claimed function. *See Intellectual Science*, 589 F.3d at 1183-86.

ULT further argues, regardless of the testimony of Dr. Roberts, no reasonable jury could find the structure of the accused products equivalent to the control means of the '529 patent given the undisputed differences adduced at trial. *See* Br. Supp. ULT's JMOL 12-13, ECF No. 246. ULT focuses on two distinctions in particular: 1) that the accused products draw power when shutdown; and 2) that the accused products use a "program start" rather than "rapid start" configuration. *Id.* Despite ULT's characterization, neither distinction was "undisputed." Rather, in regards to the first alleged difference, Andrew Bobel testified that the '529 patent would draw power when shutdown,

just at substantially lower levels than previously required. *See* App. Supp. LBC's Resp. ULT's JMOL 150-51, ECF No. 248. As to the second alleged difference, Dr. Roberts continually testified that programmed start ballasts are a subset of rapid start ballasts. *Id.* at 189-90. Given such conflicting testimony and evidence, the Court resolving a motion for judgment as a matter of law must ignore or reject any evidence the jury was not required to believe. Viewing the evidence in that light, the Court cannot say that no reasonable juror could find the alleged differences insubstantial.

Leaving aside the obvious evidentiary disputes in the record, ULT invites the Court to find that to the extent such differences indisputably exist, such differences are substantial as a matter of law. ULT cites this Court to no supporting case law and, indeed, such a conclusion would fly in the face of the Court's construction of the "control means" limitation. The Court identified neither function in construing the "control means" limitation. *See* Jury Charge 8, ECF No. 241. Moreover, the corresponding structure identified by the Court during claim construction makes no mention of such differences. Accordingly, the Court finds that it was the duty of the jury to weigh the conflicting testimony regarding the allegedly undisputed differences identified by ULT. The Court further finds that, even ignoring the clearly conflicting evidence adduced at trial, ULT's argument seeks to import new limitations into the "control means" limitation in conflict with the Court's claim construction.

ULT's final argument for judgment as a matter of law on the basis of the "control means" limitation is that the ICs in the accused ULT ballasts were not available at the time the '529 patent issued, barring a finding of equivalence. *See* Br. Supp. ULT's JMOL 13-14, ECF No. 246. ULT's argument goes to the heart of the difference between an equivalence analysis under the doctrine of

equivalents and under §112 ¶6. “Structural equivalents and the doctrine of equivalents are ‘closely related.’” *Welker Bearing Co.*, 550 F.3d at 1099 (quoting *Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc.*, 145 F.3d 1303, 1309 (Fed. Cir. 1998)). “They are related in the sense that both §112 ¶6 and the doctrine of equivalents apply ‘similar analysis of insubstantiality of the differences’ between a disclosed structure and an accused infringing structure.” *Id.* (quoting *Chiuminatta*, 145 F.3d at 1310). “However, an important difference between the two inquiries ‘involves the timing of the separate analyses for an ‘insubstantial change.’” *Id.* (quoting *Al-Site Corp. v. VSI Int’l, Inc.*, 174 F.3d 1308, 1320 (Fed. Cir. 1999)). “Namely, an equivalent structure under §112 ¶6 ‘must have been available at the time of the issuance of the claim,’ whereas the doctrine of equivalents can capture after-arising ‘technology developed after the issuance of the patent.’” *Id.* (quoting *Al-Site Corp.*, 174 F.3d at 1320).

ULT argues that since application specific ICs (“ASIC”) were not available at the time the ‘529 patent issued, they cannot constitute “equivalent structures” as a matter of law. *See* Br. Supp. ULT’s JMOL 13-14, ECF No. 246. ULT argues that “[u]ncontested testimony established that ASICs and microcontrollers . . . were not developed until the late 1990s, after the ‘529 patent issued.” *Id.* The portion of the trial record ULT cites for the above proposition states that “ICs for controlling ballasts were not readily available to us” due to their “expense,” noting that “a more cost effective solution for us was discreet implementation.” *See* App. Supp. ULT’s JMOL 154-55, ECF No. 246. This testimony does not, in fact, stand for the proposition that ICs were not available at the time the ‘529 patent issued. Indeed, at the close of ULT’s cited testimony it states: “At this time frame in 1997, integrated circuits started to become available to us and also in a cost point that was attractive” *Id.* at 156. These portions of the trial record only show that during the early 1990’s

ICs for ballasts were not cost effective, but that such ICs were readily available by 1997. Similarly, ULT states that “Mr. Bobel himself agreed that ICs made for ballasts specifically were not available at the time” of the issuance of the ‘529 patent. *See* Br. Supp. ULT’s JMOL 13-14, ECF No. 246. However, a review of his actual trial testimony illustrates that Bobel stated that he could not find an IC that worked or performed in a ballast the way he “wanted.” *See* App. Supp. ULT’s JMOL 104, ECF No. 246. While the jury may have been able to reasonably infer that ICs for ballasts were not available based on Bobel’s testimony, there is certainly no undisputed testimony to that effect.

In fact, not only is ULT’s cited testimony not on point, but it completely ignores Dr. Roberts’ testimony to the contrary. As noted *supra*, when considering a motion for judgment as a matter of law, “although the court should review the record as a whole, it must disregard all evidence favorable to the moving party that the jury is not required to believe.” *Reeves*, 530 U.S. at 151. Dr. Roberts testified that he began working with ICs in 1964, and saw an IC used in a ballast as early as 1980. *See* App. Supp. LBC’s Resp. ULT’s JMOL 13, ECF No. 248. He further testified that “anybody skilled in the art would have been aware of integrated circuits in 1993.” *Id.* at 16. Once again, given the conflicting evidence on the issue, the Court must disregard the evidence favorable to the moving party (ULT) that the jury was not required to believe.

Accordingly, the Court finds that the jury had legally sufficient evidence to determine that ICs for electronic ballasts were available at the time of the issuance of the ‘529 patent.

3. “Direct Current Blocking Means” Limitation

ULT moves for judgment as a matter of law on the ground that LBC failed to present legally sufficient evidence that the accused products infringe the “direct current blocking means” limitation of the asserted claims. *See* Br. Supp. ULT’s JMOL 14, ECF No. 246. ULT contends that LBC

failed to present legally sufficient evidence that the accused products meet this claim limitation on two grounds: 1) LBC provided no evidence that the capacitors identified by Dr. Roberts as comprising the “direct current blocking means” are the same as or equivalent to the DC blocking capacitors the Court identified as the corresponding structure; and 2) LBC presented no evidence that the accused products are “connected to” gas discharge lamps as required by this claim limitation. *Id.* at 14-16. Dealing with ULT’s second ground first, ULT relies entirely on the arguments made *supra* in contending that the Court should construe “connected to” to require actual physical connection. *Id.* at 16 (citing to Section I of the brief, which discussed the “output terminals” limitation of claim 1). For the same reasons discussed above, the Court finds that ULT’s argument regarding the “connected to” phraseology is not well-taken and does not accord with the way the patent as a whole should be read.

Returning to ULT’s first ground, ULT argues that LBC provided no evidence that the capacitors Dr. Roberts identified in the accused products as comprising the “direct current blocking means” are an identical or equivalent structure. *Id.* at 14. The Court construed the “direct current blocking means” limitation, much like the “control means” limitation discussed above, as a means-plus-function claim governed by § 112 ¶6. *See* Jury Charge 8, ECF No. 241. “The claimed function of the ‘direct current blocking means’ is ‘operable to stop the flow of the control signal from the DC input terminals, whenever the DC control path through the filaments is broken due to lamp removal or a broken filament.’ The corresponding structure for the ‘direct current blocking means’ requirement is as follows: ‘DC blocking capacitors (08 and 25) connected to the heatable filaments of the lamp.’” *Id.*

ULT argues that the testimony of “every witness” who addressed the “direct current blocking

means” limitation conclusively established that the accused products do not have a “DC blocking capacitor” coupled to each set of output terminals as required by the Court’s claim construction. *Id.* ULT argues that in his infringement analysis, Dr. Roberts merely identified a capacitor coupled to every set of output terminals “without explanation,” and “collectively called those capacitors the ‘direct current blocking means.’” *Id.* “He never explained why the capacitors he identified were the same as or equivalent to” the corresponding structure identified by the Court. *Id.* at 14-15. ULT argues that while Dr. Roberts’ analysis “might be sufficient if *any* capacitor” could serve as an equivalent to the corresponding structure identified by the Court, LBC itself has already argued that not all capacitors are “DC blocking capacitors.” *Id.* (citing LBC’s Resp. ULT’s Mot. Recon. 1-2, 4-7, ECF No. 184). Indeed, in responding to ULT’s Motion for Reconsideration, LBC argued that the “DC blocking capacitors” identified in the Court’s claim construction “are distinct from other capacitors in the circuit.” *Id.* ULT argues that “LBC cannot have it both ways,” and that either “any” capacitor coupled to a set of output terminals satisfies the “DC blocking means limitation,” requiring a finding of invalidity, or Dr. Roberts’ infringement analysis is insufficient as a matter of law. *See* Br. Supp. ULT’s JMOL 15, ECF No. 246. Moreover, ULT argues that Dr. Roberts’ infringement analysis conflicts with his deposition testimony given only three days prior to the start of trial, in which Dr. Roberts stated that the Court’s claim construction required that each “DC blocking capacitor” be operable to stop the flow of the control signal. *Id.*

LBC responds that ULT’s argument “is based on a flawed premise.” *See* LBC’s Resp. ULT’s JMOL 16, ECF No. 247. LBC states that ULT’s argument is incorrect on two grounds: 1) “it ignores the claim language ‘coupled to the output terminals,’ which require[s] that each set of output terminals be accounted for[;]” and 2) “it fails to distinguish between individual DC blocking

capacitors and the DC blocking means as a whole.” *Id.* at 16-17. LBC contends that the DC blocking capacitors, in both the ‘529 patent and the accused products, must as a whole account for each set of output terminals such that they are collectively operable to stop the flow of the DC control signal whenever the DC control path is broken due to lamp removal or a broken filament. *Id.* at 17. According to LBC, Dr. Roberts correctly identified the function of the “DC blocking means,” the proper corresponding structure, and clearly explained the manner in which structures in the accused products were equivalent to the structures identified in the ‘529 patent. *Id.*

Dr. Roberts testified that the function of the “DC blocking means” limitation was to stop the flow of the control signal whenever the DC control path was broken due to lamp removal or a broken filament. *See* App. Supp. LBC’s Resp. ULT’s JMOL 60-62, ECF No. 248. He then identified a collection of capacitors in each of the accused products which were both operable to stop the flow of the DC control signal, and capable of accounting for each set of output terminals. *Id.* at 60-63. For example, testifying regarding the representative Linear Group 1 product, Dr. Roberts carefully identified three separate capacitors as “DC blocking capacitors,” noting which capacitors were coupled to which set of output terminals. *See* App. Supp. ULT’s JMOL 35, ECF No. 246. He then explained that those three capacitors collectively compose a “single DC blocking means.” *Id.* Dr. Roberts further explained to the jury that “[b]ecause the middle set of terminals is connected to these two series connected filaments, one in each lamp, if either lamp is removed it is like pulling out a lamp on a Christmas tree string. If either lamp is removed then the connection is broken to the middle terminal and the DC current – and the DC control current will stop.” *Id.* at 36. Accordingly, as with the “control means” limitation discussed above, Dr. Roberts carefully identified the structures (discreet capacitors) in the accused products that perform the function of the “DC

blocking means.” *Id.* at 35-37. On that basis, Dr. Roberts testified that the accused products literally infringe the ‘529 patent using identical structures, to perform an identical function, in an identical manner.

“For a means-plus-function claim term, the term literally covers an accused device if the relevant structure in the accused device performs the identical function recited in the claim and that structure is identical to or equivalent to the corresponding structure in the specification.” *Intellectual Science*, 589 F.3d at 1183 (Fed. Cir. 2009) (citing *Welker Bearing*, 550 at 1099). Dr. Roberts’ testimony is clearly a legally sufficient evidentiary basis for the jury to conclude that the accused products perform the function of stopping the DC control signal whenever a gas discharge lamps is removed or has a broken filament. Moreover, Dr. Roberts’ testimony shows that the accused products, like the ‘529 patent, use capacitors to perform this function.

ULT argues that even if a reasonable jury could find that the accused products literally infringe the “direct current blocking means” limitation of the ‘529 patent, a reasonable jury could not find both literal infringement and simultaneously find that the ‘529 patent was not invalid as anticipated. *See* Br. Supp. ULT’s JMOL 15, ECF No. 246. However, ULT fails to recognize that they had the burden to prove to the jury by *clear and convincing* evidence that the cited Japanese prior art references anticipated each and every limitation of the ‘529 patent. A reasonable jury could find infringement by a preponderance of the evidence, without being able to find invalidity by clear and convincing evidence. As discussed at greater length *infra*, the jury had a reasonable evidentiary basis to find that ULT did not meet its burden to prove invalidity by clear and convincing evidence.

Accordingly, the Court declines ULT’s motion for judgment as a matter of law on the basis of the “direct current blocking means” limitation.

4. Linear Group 3 Products

ULT seeks judgment as a matter of law on the Linear Group 3 products on the basis that there was legally insufficient evidence of literal infringement that the products infringe claims 1, 2 and 5 of the '529 patent. *See* Br. Supp. ULT's JMOL 16, ECF No. 246. ULT argues that since the Court struck Dr. Roberts' testimony regarding the Linear Group 3 products, and the exhibits presented in conjunction with Dr. Roberts' testimony, the jury's verdict of infringement on such products was "completely without evidentiary support." *Id.* According to ULT, the only record evidence regarding the accused Linear Group 3 products before the jury was Joint Exhibit 81, and the testimony of Mr. Burke that the products do not meet the "direct current blocking means" or "control means" limitations of the '529 patent. *Id.* at 17. ULT argues that Joint Exhibit 81 displays the DC control signal only passing through one lamp, which is insufficient to establish infringement. *Id.*

LBC argues that ULT misrepresents the state of the trial record and the extant record evidence before the jury. *See* LBC's Resp. ULT's JMOL 18, ECF No. 247. First, LBC contends that Joint Exhibit 81 provides a detailed schematic for the Linear Group 3 representative products, illustrating its component parts and showing how it works. *Id.* LBC argues that the jury "could have compared" that schematic to the other schematics in evidence containing Dr. Roberts' markings. *Id.* Moreover, LBC argues that because both Dr. Roberts and Mr. Burke explained that the Linear Group 3 products function almost identically to the Linear Group 1 and 2 products, the jury could have reasonably concluded that the Linear Group 3 products infringe the '529 patent. *Id.* at 19.

Dr. Roberts testified at length during trial about the structure and function of the Linear

Group 3 representative product, concluding that the products literally infringe each claim limitation of the '529 patent. *See* App. Supp. ULT's JMOL 44-52, ECF No. 246. During his testimony, Dr. Roberts drew the DC control path, showing the path going through the output terminals of both the upper and lower lamp in a two-lamp configuration of the Linear Group 3 representative product. *Id.* at 45-48. Dr. Roberts' testimony, however, conflicted with his expert report and his opinion had not been disclosed to ULT until he was actually on the stand. As a result, the Court struck the entirety of Dr. Roberts' testimony regarding the Linear Group 3 products, and struck the exhibits created and presented during the course of his testimony. *Id.* at 56. ULT argues that because the Court struck the above evidence, the jury could only rely on Joint Exhibit 81, showing Dr. Roberts' original, one-lamp DC control path, and the testimony of Mr. Burke.

Problematically for ULT, the great weight of the evidence shows that virtually every witness that testified grouped the Linear Group 3 products with the Linear Group 1 and 2 products for the purposes of infringement. Dr. Roberts explained that ULT used the same IC in all of their Linear Group 1, 2, and 3 products, providing for an identical "equivalence" analysis for all three product groups. *See* App. Supp. LBC's Resp. ULT's JMOL 75-76, ECF No. 248. Moreover, Mr. Burke and ULT grouped "the ULT Linear 1 to 3 ballasts" together on direct. *Id.* at 215-16. Mr. Burke expounded his non-infringement expert opinions regarding all three products collectively, noting that the products were the "same" in a wide variety of ways. *Id.* at 215-17. However, Mr. Burke did note that the products shut down oscillations and sense fault differently. *Id.* at 217. In particular, Mr. Burke explained that the Linear Group 3 products use "two different types of shut downs," a voltage and a current sense. *Id.* at 220. This is almost identical to his testimony regarding Linear Group 1, and underscored ULT's attempts to avoid a jury finding of equivalence on the

“control means” limitation of the ‘529 patent. *Id.* Mr. Burke then concluded that he viewed “the linear ballasts” as “substantially different” from the ‘529 patent. *Id.* at 220-21.

The record evidence regarding the Linear Group 3 products consists of Joint Exhibit 81, the non-struck testimony of Dr. Roberts that the linear products use the same IC, and Mr. Burke’s testimony. Mr. Burke, in particular, continuously grouped the products together, differentiating them solely for the purpose of discussing their slightly different “control means.” *Id.* at 220. The great weight of the evidence, presented by both parties, underscored the overriding similarity between the linear products, with Mr. Burke highlighting only the minimal differences referenced above. Combined with the schematic and the testimony of Dr. Roberts, and giving due deference to the jury verdict, the Court finds that reasonable jurors could rely on the testimony of the arrayed experts and conclude that the Linear Group 3 products infringed the ‘529 patent in the same way and for the same reasons as the Linear Group 1 and 2 products.

5. Invalidity

ULT seeks judgment as a matter of law on the basis that the asserted claims of the ‘529 patent are invalid as anticipated by JP ‘997 and JP ‘799. *See* Br. Supp. ULT’s JMOL 17, ECF No. 246. ULT contends that it presented “largely uncontested” evidence of anticipation, and that “[o]n the few contested points” LBC’s arguments run counter to the claim construction, claim language, or LBC’s own infringement contentions.

“Anticipation requires a showing that each element of the claim at issue, properly construed, is found in a single prior art reference.” *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292, 1323 (Fed. Cir. 2011). “Under § 282 of the Patent Act of 1952, ‘[a] patent shall be presumed valid’ and ‘[t]he burden of establishing invalidity of a patent or any claim thereof shall rest on the party

asserting such invalidity.” *Microsoft Corp. v. i4i Ltd. P’ship*, 564 U.S. ___, No. 10-290, at 1 (June 9, 2011) (quoting 35 U.S.C. § 282). “But, while the statute explicitly specifies the burden of proof, it includes no express articulation of the standard of proof.” *Id.* at 6. However, “by stating that a patent is ‘presumed valid,’ Congress used a term with a settled meaning in the common law.” *Id.* at 7. Analyzing the common law import of a patent’s presumption of validity, the Supreme Court held that a defendant must prove invalidity by “clear and convincing evidence.” *Id.* at 8 (“According to its settled meaning, a defendant raising an invalidity defense bore ‘a heavy burden of persuasion,’ requiring proof by clear and convincing evidence.”) (quoting *Radio Corp. of Am. v. Radio Eng’g Labs.*, 292 U.S. 1, 8 (1934)). In accord with this recent Supreme Court precedent, the Court instructed the jury that “[i]n order to overcome the presumption of validity, Defendant must show it is highly probable the asserted claims of the patent are invalid.” See Jury Charge 15, ECF No. 241.

In reviewing the jury verdict, the Court must be mindful that “[a]nticipation is a factual determination that is reviewed for substantial evidence when decided by a jury.” *Koito Mfg. Co. v. Turn-Key-Tech, LLC*, 381 F.3d 1142, 1149 (Fed. Cir. 2004). The Court may grant judgment notwithstanding a jury verdict of anticipation “only if the jury’s factual findings are not supported by substantial evidence.” *Baxter Int’l, Inc. v. McGaw, Inc.*, 149 F.3d 1321, 1332 (Fed. Cir. 1998).

A. ‘JP 997

ULT contends that the Court should enter judgment in its favor on the basis that the asserted claims of the ‘529 patent are invalid as anticipated by JP ‘997. *Id.* ULT invalidity expert Professor Michael Giesselmann (“Giesselmann”) testified that JP ‘997 disclosed every element of claim 1 of the ‘529 patent. *Id.* ULT argues that LBC failed to rebut Giesselmann’s testimony that ‘JP 997

taught all the claim limitations of claim 1, except in regards to the “direct current blocking means” limitation. *See* Br. Supp. ULT’s JMOL 18, ECF No. 246. ULT further argues that even on the “direct current blocking means” limitation, LBC did not dispute Giesselmann’s testimony that capacitors C2a and C2b perform the DC blocking means, and that such capacitors were connected to each of the four lamp filaments. *Id.* ULT contends that Dr. Zane’s rebuttal, that C2a and C2b were not “DC blocking capacitors” because they did not heat the filaments and were not connected in series with secondary windings, violates the Court’s claim construction of the “direct current blocking means” limitation. *Id.* Moreover, ULT argues that Dr. Zane stated that a capacitor must be connected to “every” output terminal, while under the Court’s construction a capacitor need only be connected to each set of output terminals. *Id.*

Giesselman also testified that JP ‘997 anticipates claim 2 and claim 5 of the ‘529 patent. According to ULT, Dr. Zane did not dispute Giesselmann’s testimony regarding claim 2. *Id.* at 19. Dr. Zane did dispute Giesselmann’s testimony regarding claim 5, but ULT contends that his testimony conflicted with LBC’s infringement theory. *Id.* Accordingly, ULT argues that no reasonable juror could have found claim 5 both infringed and invalid. *Id.*

LBC responds that the trial record provides a legally sufficient evidentiary basis for the jury’s verdict that ULT did not meet its burden to prove invalidity by clear and convincing evidence. *See* LBC’s Resp. ULT’s JMOL 19, ECF No. 247. LBC argues that Dr. Zane testified that JP ‘997 does not teach the “direct current blocking means” limitation because the alleged means in the prior art reference does not account for each set of output terminals. *Id.* at 19-20. LBC also contends that Giesselmann’s testimony was substantially undercut on cross-examination, allowing the jury to conclude that ULT did not meet its weighty evidentiary burden. *Id.*

Dr. Zane testified that due to the “different approach” to approach to heating the filaments taught by JP ‘997, the inventor failed to anticipate the “direct current blocking means” limitation of claim 1. *See* App. Supp. LBC’s Resp. ULT’s JMOL 268-69, ECF No. 248. Specifically, Dr. Zane agreed “that the DC blocking means is the collection of the DC blocking capacitors” and that they “collectively must account for each set of output terminals.” *Id.* at 269. Dr. Zane then agreed that “it is for that reason that this reference does not teach DC blocking means.” *Id.* Moreover, as noted by LBC, on cross-examination Giesselmann explained that he would have to “redraw” the schematic of JP ‘997 to show how one of the alleged “DC blocking capacitors” was connected to a certain set of output terminals. *Id.* at 248.

The Court may only grant ULT’s motion “if the jury’s factual findings are not supported by substantial evidence.” *Baxter Int’l, Inc. v. McGaw, Inc.*, 149 F.3d 1321, 1332 (Fed. Cir. 1998). ULT contends that Giesselmann presented undisputed testimony that the capacitors C2a and C2b “were connected to each of the four lamp filaments.” *See* Br. Supp. ULT’s JMOL 18, ECF No. 246. To the contrary, however, Giesselmann’s allegedly undisputed expert opinion was actually undercut on cross-examination. During direct examination, Giesselmann was asked about the whether JP ‘997 disclosed the direct current blocking means. *See* App. Supp. ULT’s JMOL 238, ECF No. 246. He responded: “Yeah. You would have to redraw this a little bit to show it, but so basically direct current cannot go past here. These capacitors, they act as DC blocking capacitors.” *Id.* However, Geiselmann testified that he did not disclose this connection in his report or at anytime prior to trial. *Id.* at 239-40.

On cross-examination, counsel for LBC asked Gieselmann about the capacitor he attempted to re-draw in an effort to show it connected to a particular set of output terminals. *See* App. Supp.

LBC's Resp. ULT's JMOL 248, ECF No. 248. Giesselmann testified that the capacitor C 30 was "effectively connected to two" output terminals. *Id.* He then testified that he wanted to "redraw" his schematic, to show how it accounted for a different set of output terminals. *Id.* When asked if he had disclosed such a drawing in his report, Gieselmann responded "no." *Id.* Counsel for LBC asked similar questions regarding capacitor C 26, eliciting testimony from Giesselmann that nothing in his drawings or report showed that the capacitor accounted for the output terminals he had previously testified that they accounted for. *Id.* at 249. Moreover, as noted by LBC, Dr. Zane specifically testified that JP '997 failed to teach DC blocking means capable of accounting for each "set" of output terminals. *See* LBC's Resp. ULT's JMOL 20, ECF No. 247. While ULT argues that Dr. Zane incorrectly testified that a capacitor must be directly connected to every output terminal, he clearly stated "[c]orrect" when asked whether the DC blocking means must account for each *set* of output terminals. *See* App. Supp. LBC's Resp. ULT's JMOL 269, ECF No. 248. On that basis, Dr. Zane testified that JP '997 does not teach the "direct current blocking means" limitation of claim 1 of the '529 patent.

Considering the extant evidence in the light most favorable to the non-movant, the Court finds that the jury's verdict not finding invalidity on the basis of JP '997 is supported by substantial evidence.

B. JP '799

ULT argues that Dr. Zane attempted to draw two distinctions between the '529 patent and JP '799, and that both distinctions conflict with LBC's infringement contentions. *See* Br. Supp. ULT's JMOL 19, ECF No. 246.

According to ULT, Dr. Zane attempted to argue that claim 1 requires a resonant signal,

specifically an AC signal. *Id.* at 19-20. ULT argues that a reasonable juror could not have accepted this as a distinction over prior art because that language is not found in the claim or in the specification. *Id.* at 20. Moreover, according to ULT, Dr. Zane's contention that JP '799 does not disclose an equivalent structure to the control means of the '529 patent runs counter to LBC's infringement contentions. *Id.* Specifically, ULT argues that Dr. Zane's contention that because part of the "control means" identified by Giesselmann was just a "box" it did not disclose an equivalent structure, runs counter to LBC's contention that the ICs contained in the ULT products use a structure equivalent to the control means in the '529 patent. *Id.* LBC responds that Dr. Zane clearly testified that JP '799 does not anticipate any of the asserted claims because it does not teach the control means limitation. *See* LBC's Resp. ULT's JMOL 20, ECF No. 247.

ULT's contention that Dr. Zane's testimony regarding the "black box" displayed in JP '799 runs counter (or is logically inconsistent) with LBC's infringement contentions regarding the ICs in the accused products ignores the substantial differences between the testimony of Dr. Roberts (on the ICs) and Giesselmann on the "black box." Neither Giesselmann nor ULT presented evidence as to the structure, makeup, or precise function of the "black box." In contrast, Dr. Roberts explained precisely what the "box" on the accused products was (an IC), what it represented, how it worked, and how it performed the identical function of the control means. The contrast in the extent and quality of the testimony on these "boxes" is stark, and ULT creates a false contradiction in seeking to compare them.

Indeed, Dr. Zane's testimony underscores these differences. As Dr. Zane noted, the means for initiating the oscillations in JP '799 is "an empty box." *See* App. Supp. LBC's Resp. ULT's JMOL 265, ECF No. 247. He stated that while he could "insinuate" or "imagine" the makeup and

nature of the box, “there is just no[t] sufficient detail included in this patent” to actually compare it to the ‘529 patent. *Id.* at 265-66. He then testified that he could not determine if the box represented an IC, microcontroller, or series of specially designed electrical component. *Id.*

Given the paucity of testimony regarding the manner in which JP ‘799 teaches the “control means” limitation of the ‘529 patent, the Court finds that the jury’s verdict not finding invalidity is supported by substantial evidence.

6. Marking Requirement

ULT contends that no reasonable jury could find that it is more probable than not that the licensees of the ‘529 patent complied with the marking statute, precluding LBC from collecting damages for the time prior to when ULT was given actual notice that it was alleged to infringe the ‘529 patent. *See Br. Supp. ULT’s JMOL 23-25, ECF No. 246.*

Under 35 U.S.C. § 287(a), a patentee or licensee selling a patented product must mark that product as patented to put the public on notice. “In determining whether the patentee marked its products sufficiently to comply with the constructive notice requirement [of § 287(a)], the focus is not on what the infringer actually knew, but on whether the patentee’s actions were sufficient in the circumstances, to provide notice *in rem.*” *Nike, Inc. v. Wal-Mart Stores, Inc.*, 138 F.3d 1437, 1446 (Fed. Cir. 1998) (citing *Amsted Indus. v. Buckeye Steel Castings*, 24 F.3d 178, 187 (Fed. Cir. 1994)). “Thus the statute defines that ‘[a patentee] is entitled to damages from the time when it either began marking its product in compliance with section 287(a)[, constructive notice] or when it actually notified [the accused infringer] of its infringement, whichever was earlier.’” *Maxwell v. J. Baker, Inc.*, 86 F.3d 1098, 1111 (Fed. Cir. 1996) (quoting *Am. Med. Sys., Inc. v. Med. Eng’g Corp.*, 6 F.3d 1523, 1537 (Fed. Cir. 1993)). The patentee must prove compliance with the marking statute by a

preponderance of the evidence. *Id.* “Compliance with section 287(a) is a question of fact,” reviewed for substantial evidence. *Id.*

“[L]icensees . . . and other authorized parties . . . must also comply” with the marking requirements of § 287(a). *Id.* “However, with third parties unrelated to the patentee, it is often more difficult for a patentee to ensure compliance with the marking provisions.” *Id.* “Therefore, when third parties are involved, the number of [items] sold without proper marking is not conclusive of the issue [of] whether the patentee’s marking was ‘substantially consistent and continuous.’” *Id.* Rather, “[w]hen failure to mark is caused by someone other than the patentee, the court may consider whether the patentee made reasonable efforts to ensure compliance with the marking requirements.” *Id.* at 1112.

ULT contends that LBC did not present sufficient evidence of consistent and continuous marking. *See* Br. Supp. ULT’s JMOL 24, ECF No. 246. According to ULT, the “scant and conclusory” evidence proffered by LBC during trial cannot show substantial and continuous marking. According to ULT, Mr. Bobel’s testimony and the presentation of one marked Robertson electronic ballast fails as a matter of law. *Id.* LBC responds that the jury heard “ample” evidence that Bobel complied with the marking requirements. *See* LBC’s Resp. ULT’s JMOL 23, ECF No. 247. Specifically, LBC notes that Bobel’s license with Robertson Transformer Company (“Robertson”) provided for marking, that Bobel testified that he required and policed marking of such products, and that in support of such testimony Bobel presented a marked Robertson ballast. *Id.* Lastly, LBC cites a 2008 letter from Bobel to Robertson terminating their license agreement, in which Bobel identified unpaid royalties as the sole reason for Robertson’s default under the agreement. *Id.*

ULT relies on an unpublished Federal Circuit decision, *K&K Jump Start/Chargers, Inc. v. Schumacher Electric Corp.*, 52 F. App'x 135 (Fed. Cir. Nov. 25, 2002), for the proposition that LBC's evidence of marking was insufficient as a matter of law. In *K&K Jump Start*, the court reviewed the district court's refusal to grant judgment as a matter of law that the plaintiff (K&K) was only entitled to damages from after the date the suit was filed. 52 F. App'x at 141. The patentee had licensed the patent at issue to a licensee, who agreed to mark any products in accordance with § 287(a) in their licensing contract. *Id.* "Although there was a provision in the contract between K&K and Century[, the licensee,] requiring marking, K&K took *no steps* to determine if Century was actually marking the products until after the start of the current litigation." *Id.* The *K&K Jumpstart* court held that the district court should have granted judgment in the defendant's favor that K&K failed to comply with the marking requirements. *Id.* However, the court continued, noting that "[w]e do not hold that bare evidence of a contractual provision requiring marking can never constitute reasonable efforts by the patentee to ensure that a licensee is marking the products properly, but under the circumstances here the jury's conclusion that K&K has met its burden to show compliance is not supported by substantial evidence." *Id.*

Despite ULT's insistence to the contrary, LBC presented substantially more evidence than the plaintiff in *K&K Jumpstart*. In *K&K Jumpstart*, the plaintiff submitted "bare evidence of a contractual provision requiring marking." *Id.* While the Federal Circuit noted the importance of such a provision, the court nonetheless held that the "bare" provision was insufficient based on the facts in that case. *Id.* In addition to marking provisions in each licensing contract, LBC also presented testimony from Bobel that he consistently policed marking at Robertson. Moreover, LBC bolstered such evidence by presenting a Robertson electronic ballast containing a mark identifying

the '529 patent. This array of evidence stands in marked contrast to the "bare contractual provision" solely relied on by the plaintiff in *K&K Jumpstart*. LBC presented a contractual provision bolstered by Bobel's undisputed testimony, and an electronic ballast actually bearing the mark of the '529 patent. Moreover, any alleged failure to mark would have been caused by someone other than the patentee, so the Court must look to evidence of diligence on the part of the patentee rather than relying purely upon evidence of actual marking. *Cf. Maxwell*, 86 F.3d at 1111-12.

Accordingly, considering the undisputed evidence of marking in the light most favorable to the non-movant, the Court finds that there was clear and substantial evidence sufficient to support the jury's verdict of marking.

7. Damages

ULT seeks judgment that the "3,000,000.00" written by the jury on the jury verdict form represents a lump sum royalty payment. *See* Br. Supp. ULT's JMOL 21, ECF No. 246. ULT contends that based on the evidence adduced at trial, and counsel for LBC's refusal to allow the jury to indicate whether any damages award represented a lump sum or running royalty, the Court should find that the damages award in the instant case represents a lump sum royalty payment. *Id.* at 21-23. LBC responds that the weight of the evidence supports deeming the damages award a running royalty rate based on the multiple running royalty licenses LBC presented to the jury. *See* LBC's Resp. ULT's JMOL 20, ECF No. 247. Moreover, LBC rejects ULT's contention that it refused ULT's efforts to clarify the jury form, contending that ULT's alleged efforts amounted to "a thinly veiled attempt to have the jury render a verdict that would cover future infringement." *Id.* at 20-21. LBC also moves this Court, in both its Response and in its Motion for Entry of Judgment, to enter a permanent injunction against ULT, arguing that the damages award represents a running royalty

for those infringing goods sold before trial. *Id.* at 21.

“A patentee is entitled to ‘damages adequate to compensate for infringement, but in no event less than a reasonable royalty.’” *Worldtech Sys. Inc. v. Integrated Networks Solutions, Inc.*, 609 F.3d 1308, 1319 (Fed. Cir. 2010) (quoting 35 U.S.C. § 284). In assessing a damages award, “a court must ask, “[H]ad the Infringer not infringed, what would [the] Patent Holder[] have made?”” *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324 (Fed. Cir. 2009) (quoting *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377 U.S. 476, 507 (1964)). “The burden of proving damages falls on the patentee.” *Id.* “A reasonable royalty can be calculated from an established royalty, the infringer’s profit projections for infringing sales, or a hypothetical negotiation between the patentee and infringer based on the factors in *Georgia-Pacific*.” *Id.* (citing *Lucent Techs. v. Gateway, Inc.*, 580 F.3d 1301, 1324 (Fed. Cir. 2009)). “The hypothetical negotiation ‘attempts to ascertain the royalty upon which the parties would have agreed had they successfully negotiated an agreement just before infringement began,’ and ‘necessarily involves an element of approximation and uncertainty.’” *Worldtech*, 609 F.3d at 1320 (quoting *Lucent*, 580 F.3d at 1324-25). Such a negotiation can result in either a running royalty rate, or a lump-sum royalty payment. *See Lucent*, 580 F.3d at 1325.

In this case, the verdict form question under Damages asked: “What sum of money, if any, do you find from a preponderance of the evidence is adequate to compensate Plaintiff for Defendant’s conduct that you found to infringe? Provide the amount, if any, in dollars and cents.” *See* Jury Charge 26, ECF No. 241. On the line below this question, the foreman wrote “3,000,000.00.” *Id.* During the charge conference, counsel for ULT argued that “we should have some way for the jury to tell us what type of award they’re giving.” *See* App. Supp. ULT’s JMOL

304, ECF No. 246. Counsel for LBC responded that they were not seeking, and the jury could not award, “future damages” meaning no further instruction was necessary.” *Id.* at 305. The Court declined to add the additional instruction. *Id.* at 311-13. However, as anticipated by counsel for ULT, the parties now debate the import of the jury’s damages award.

In *Telecordia Technologies, Inc. v. Cisco Systems, Inc.*, the Federal Circuit dealt with a similarly ambiguous jury verdict. 612 F.3d 1365, 1378 (Fed. Cir. 2010). In that case, the defendant appealed the district court’s damages decision that the notation “\$6,500,000 (6.5 MIL)” only compensated the plaintiff for past infringement. *Id.* Reviewing the district court’s decision, the Federal Circuit stated that the “verdict form is unclear whether the jury compensated Telecordia only for Cisco’s past infringement or for both past and ongoing infringement.” *Id.* Cisco argued that the award represented “a paid-up, lump-sum licensing fee.” *Id.* at 1377-78. The appellate court noted that “[d]istrict courts have broad discretion to interpret an ambiguous verdict form” and are in the best “position to assess whether the verdict figure represented past infringement as well as ongoing infringement.” *Id.* at 1378. In *Telecordia*, the jury award was closer to the amount proposed by Cisco than the award proposed by Telecordia, but neither party had proposed the 6.5 million. *Id.* Ultimately, the Federal Circuit held that the district court’s decision was not clearly erroneous.

Looking to the evidence adduced at trial, Bobel clearly enunciated a preference for a lump-sum payment, even when those payments were accompanied by running royalty rates. ULT presented evidence through Mr. Milani that the result of a hypothetical negotiation would be a \$1.5 million lump-sum royalty payment licensing the patent to ULT through its expiration. In contrast, LBC’s expert, Mr. Gallagher, proposed damages awards based on various running royalty rates, including 4.5%, 6.5% and 7.5%. *See App. Supp. ULT’s JMOL 131-33, ECF No. 246.* These

royalty rates, applied to ULT sales of accused products through April 30, 2011, result in proposed damages awards of \$9.3 million, \$13.5 million, and \$15.6 million. *Id.* Moreover, Mr. Gallagher specifically testified that, in his opinion, the appropriate damages award “would be something towards the higher end.” *Id.* at 133. Indeed, Mr. Gallagher opined that, in the jury’s position, he would apply a running royalty rate of 6%, resulting in a damages award for past infringement equaling \$12,943,000. *Id.* LBC argues that, despite this discrepancy, the Court should consider the quantity of running royalty rate-based licenses LBC presented to the jury. *See* LBC’s Resp. ULT’s JMOL 21, ECF No. 247 (“LBC presented the jury with evidence of multiple licenses that relied on a running royalty rate.”). LBC argues that ULT “attempts to ignore the thrust of these licenses by only considering their upfront payment provisions.” *Id.* To the contrary, ULT focuses on those provisions because they underscore Bobel’s testimony regarding the importance of up front, lump-sum royalty payments. These provisions, in conjunction with Bobel’s testimony, make it more likely than not that Bobel would have entered into a lump-sum license agreement in the hypothetical negotiation.

Accordingly, given the evidence adduced at trial, the similarity between the damages verdict and ULT’s damages position, the extremely close similarity to the TCP license entered into by Bobel, and the emphasis Bobel admittedly placed on lump-sum payments, the Court finds that the ambiguous damages verdict of “3,000,00.00” should be construed to represent a lump-sum royalty payment, which would grant ULT a license to use the ‘529 patent from the date of entry through the expiration of the patent.

IV. MOTION FOR ENTRY OF JUDGMENT

LBC filed a motion for entry of judgment seeking: 1) an award of prejudgment and post-

judgment interest and entry of the \$3,000,000.00 damages award; 2) a finding that this is an exceptional case under 35 U.S.C. § 285 on the basis of ULT's litigation misconduct, justifying an award of attorney's fees; 3) a permanent injunction barring ULT from continuing to infringe claims 1, 2 and 5 of the '529 patent; and 4) a declaration stating that the '529 patent is infringed and valid. *See* LBC's Mot. Entry Judgment 1, ECF No. 244.

Preliminarily, pursuant to the Court's finding that the damages verdict of \$3,000,000.00 represents a lump-sum royalty agreement, LBC's request for a permanent injunction is **DENIED**. Under the Court's construction of the ambiguous jury verdict, the parties of the hypothetical negotiation agreed on a \$3,000,000.00 lump-sum payment in return for a license to practice the '529 patent through the patent's expiration. Accordingly, despite the Court upholding the finding of infringement, there is no basis for a permanent injunction as the damages cover ULT's licensing through the expiration of the patent in 2013. Moreover, as noted by ULT, LBC seeks entry of a declaratory judgment pursuant to ULT's counterclaim for declaratory judgment. *See* LBC's Mot. Entry Judgment 16, ECF No. 244. LBC never pled, and has never pled, a claim for declaratory relief. Further, such a request, in addition to being untimely post-trial was also rendered moot by the verdict. LBC did not respond to ULT's arguments in its Reply. *See* LBC's Reply, ECF No. 250. Accordingly, LBC's request for entry of declaratory relief is **DENIED** as untimely and moot.

Having dealt with the above issues, the Court will now consider LBC's request for prejudgment and post-judgment interest, and LBC's contention that this is an exceptional case justifying an award of attorney's fees.

1. Interest

LBC seeks an award of prejudgment and post-judgment interest applied to the damages

verdict at the current statutory rate of 5%. *See* LBC's Mot. Entry Judgment 1-4, ECF No. 244. ULT responds that the Court should deny or limit LBC's request for prejudgment interest based on the undue delay in commencing the instant suit, and that such interest should be calculated using the U.S. Treasury Bill rate ("T-rate"), compounded annually. *See* ULT's Resp. LBC's Mot. Entry Judgment 19-20, ECF No. 249. ULT further argues that LBC proposes a post-judgment interest rate at variance with current law. *Id.* at 24.

Section 284 of the Patent Act provides that "[u]pon finding for the claimant the court shall award the claimant damages adequate to compensate for infringement . . . together with interest and costs as fixed by the court." 35 U.S.C. § 284. "[P]rejudgment interest should ordinarily be awarded where necessary to afford the plaintiff full compensation for the infringement." *Gen. Motors Corp. v. Devex Corp.*, 461 U.S. 648, 655 (1983). "In the typical case an award of prejudgment interest is necessary to ensure that the patent owner is placed in as good a position as he would have been in had the infringer entered into a reasonable royalty agreement." *Id.* (citing *Waite v. United States*, 282 U.S. 508, 509 (1933)). "An award of interest from the time that the royalty payments would have been received merely serves to make the patent owner whole, since his damages consist not only of the value of the royalty payments by also of the foregone use of the money between the time of infringement and the date of the judgment." *Id.* at 655-56.

"[P]rejudgment interest should ordinarily be awarded absent some justification for withholding such an award." *Id.* at 657. "[I]t may be appropriate to limit prejudgment interest, or perhaps deny it altogether, where the patent owner has been responsible for undue delay in prosecuting the lawsuit." *Id.* "The appropriate interest rate is within the discretion of the court, and may be fixed at the statutory rate or at the higher prime rate or corporate bond rate, according to the

circumstances.” *Kerwit Med. Prods., Inc. v. N&H Instruments, Inc.*, 224 U.S.P.Q 679, 691 (N.D. Tex. 1984) (citing *Gyromat Corp. v. Champion Spark Plug Co.*, 735 F.2d 549, 556-57 (Fed. Cir. 1984)). “[T]he determination whether to award simple or compound interest similarly is a matter largely within the discretion of the district court.” *Gyromat Corp.*, 735 F.2d at 557.

ULT first argues that the Court should deny or limit any award of prejudgment interest based on LBC, or its predecessor-in-interest’s, undue delay in bringing the instant suit. *See* ULT’s Resp. LBC’s Mot. Entry Judgement 19, ECF No. 249. As ULT notes, it may be appropriate to limit or deny prejudgment interest where the patent owner unduly delays prosecuting the lawsuit, unjustifiably inflating the damages award. *Id.* at 19-20. ULT argues that LBC’s predecessor-in-interest, Mr. Bobel, unnecessarily delayed bringing this suit. *Id.* at 21. It is undisputed that by 2005, Mr. Bobel asserted that several ULT products infringed the ‘529 patent. *Id.* ULT, through their counsel Mr. Mark Patterson, replied to Mr. Bobel in 2006, informing him that ULT contended that it did not infringe the ‘529 patent and that the patent was invalid. *Id.* The instant suit was not filed until February 24, 2009, almost three years after ULT responded to Bobel’s letter. *See* Orig. Compl., ECF No. 1. ULT argues that this nearly three-year delay justifies denying or limiting an award of prejudgment interest. *See* ULT’s Resp. LBC’s Mot. Entry Judgment 21, ECF No. 249. ULT also argues that Bobel’s justification for the delay, that he was “busy,” does not suffice in light of the prejudice it worked on ULT. *Id.*

LBC responds by pointing to Bobel’s actions between Mark Patterson’s response letter and the initiation of this action nearly three years later. *See* LBC’s Reply 2, ECF No. 250. Bobel received ULT’s letter containing its non-infringement and invalidity positions in late 2006. *Id.* Subsequently, Bobel contacted Acacia in 2007. *Id.* After prolonged negotiations with Acacia,

Bobel negotiated an agreement regarding a license to the '529 patent in 2008. *Id.* Acacia then formed LBC, which instituted the current suit at the beginning of 2009. *Id.* While ULT contends that the nearly three-year delay constitutes an undue delay, resulting in unfair prejudice, the Court finds that both Bobel and LBC diligently worked to bring the current suit. In *Devex* the Supreme Court held that prejudgment interest is the norm, but that it could be denied or limited when "the patent owner has been responsible for undue delay in prosecuting the lawsuit." *Devex*, 461 U.S. at 657. In this case, leaving aside the length of the alleged undue delay relative to ULT's history of infringement, the Court notes Bobel's apparent diligence in attempting to secure a means of bringing an effective suit against ULT. Indeed, as ULT is well aware, this suit was initially instituted against several large, powerful corporations. Accordingly, Bobel's quick move to contact Acacia, negotiations with Acacia, the subsequent formation of LBC, and LBC's almost immediate move to file suit does not show an owner responsible for a delay. Rather such actions comport with a patent owner diligently seeking an effective means to challenge a host of large, wealthy corporations, having already put such corporations on notice regarding his infringement contentions. Considering these facts and the strong presumption in favor of a grant of prejudgment interest, the Court finds that an award of prejudgment interest is appropriate in this case.

After careful review of the parties' positions regarding the appropriate prejudgment interest rate, the Court finds that prejudgment interest should be calculated using the state statutory rate of 5%, compounded annually. Such interest is ordinarily awarded from the date of infringement until the entry of judgment. See *Nickson Indus. v. Rol Mfg. Co.*, 847 F.2d 795, 800 (Fed. Cir. 1988). Accordingly, per the unchallenged calculations contained in LBC's Motion, the interest total equals \$1,543,479.20, bringing the total award to \$4,543,479.20. See LBC's Mot. Entry J. 4, ECF No. 244.

Post-judgment interest shall be calculated at the rate set by 28 U.S.C. § 1961 as of the date judgment is entered in this action, compounded annually.

2. Attorney's Fees

LBC also seeks a finding that this is an “exceptional case” under 35 U.S.C. § 285, justifying an award of attorney’s fees. *See* LBC’s Mot. Entry Judgment 4, ECF No. 244. LBC bases its contention that the current case is “exceptional” on four allegations of litigation misconduct: 1) ULT blatantly violated the Court’s October 16, 2009 order requiring document production; 2) ULT produced the “Hesterman Notebook” in an untimely fashion, and produced the remaining “Hesterman Documents” less than 30 days before trial; 3) ULT deliberately attempted to “dupe” LBC and its own expert with a non-representative product; and 4) ULT “shielded” an “unqualified” investigator who destroyed documents from being its 30(b)(6) representative. *Id.* at 4-13. ULT responds that LBC fails to use the proper governing standard, that ULT committed no “litigation misconduct,” and that even assuming such misconduct other factors compel rejection of LBC’s request for exceptional case treatment. *See* ULT’s Resp. LBC’s Mot. Entry Judgment 1-13, ECF No. 249.

“The district court may, in ‘exceptional’ cases, award reasonable attorney fees to the prevailing party.” *Motorola, Inc. v. Interdigital Tech. Corp.*, 121 F.3d 1461, 1467-68 (Fed. Cir. 1997) (citing 35 U.S.C. § 285). “The decision whether to award fees is a two-pronged inquiry that requires, first, a factual finding that the case is ‘exceptional’ and, second, a discretionary decision to award fees.” *Id.* at 1468 (citing *Reactive Metals & Alloys Corp. v. ESM, Inc.*, 769 F.2d 1578, 1582 (Fed. Cir. 1985)). “Bad faith and willful infringement are not the only criteria whereby a case may be deemed ‘exceptional,’ although when either is present the requirement is more readily met.

Litigation misconduct and unprofessional behavior are relevant to the award of attorney fees, and may suffice to make a case exceptional under § 285.” *Sensonics, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1574 (Fed. Cir.1996). “It is the judicial duty to refuse to condone behavior that exceeds reasonable litigation tactics.” *Id.* at 1575. However, “the court may consider the litigation actions of both sides in connection with § 285.” *Id.*

LBC’s primary evidentiary support for the request for fees stems from ULT’s failure to produce documents timely in accordance with the Court’s October 16, 2009 Order. *See* LBC’s Mot. Entry Judgment 6-7, ECF No. 244. According to LBC, even five months after the December 13, 2009 deadline set by the Court, ULT had only produced 259 pages of material and had refused to produce any product samples unless LBC agreed to pay for such samples. *Id.* at 6. Moreover, according to LBC, thousands of documents were not produced until 14-16 months after the Court’s December 13, 2009 deadline. *Id.* LBC emphasizes that these actions were part of a pattern of delay, which forced LBC to file an Emergency Motion to Modify the Scheduling Order to seek relief from certain deadlines and to compel ULT to produce key documents. *Id.* at 7. More specifically, LBC accuses ULT of delaying in producing the “Hesterman Notebook,” and subsequent “Hesterman Documents” to LBC’s detriment. *Id.* LBC contends that “had it not been for a chance encounter” between Hesterman and LBC’s expert Dr. Zane at a conference, “LBC would never have seen these documents.” *Id.* at 8.

LBC then moves on to allege that ULT deliberately attempted to “dupe” the Court and its own expert by using a non-representative product sample. *Id.* LBC argues that ULT’s choice of C2642, Generation E, as the representative product for CFL Group 1 constitutes litigation misconduct because the product did not perform like other products it supposedly represented. *Id.*

Then, when further testing was required due to the performance of the product, ULT sought to exclude such testing. *Id.* at 9. Lastly, LBC contends that ULT shielded Travis Berry, an “unqualified” investigator responsible for the illicit destruction of documents, from acting as ULT’s 30(b)(6) representative. *Id.*

ULT contends that it committed no litigation misconduct. *See* ULT’s Resp. LBC’s Mot. Entry Judgment 4, ECF No. 249. As to the alleged discovery misconduct, ULT argues that in its initial document production it produced schematics for virtually all of the accused products and data sheets for virtually all of the ICs. *Id.* ULT then states that in May 2010, ULT produced 20,000 additional pages of documents. *Id.* After the Court’s revised claim construction, ULT produced even more documents in advance of the discovery deadline. *Id.* at 4-5. Responding to the emergency motion relied on by LBC, ULT states that in that motion LBC incorrectly claimed that ULT had yet to produce schematics, but counsel for ULT explained that the schematics had been produced in December 2009. *Id.* at 5.

Moving to the “Hesterman Documents,” ULT avers that LBC’s account of their production “is pure fiction.” *Id.* ULT contends that there was “no causal relationship” between Dr. Zane’s meeting with Mr. Hesterman and the subsequent production of the “Hesterman Documents.” *Id.* ULT states that in preparation for trial, ULT’s counsel contacted Mr. Hesterman to gauge his potential availability for trial, realized he may possess relevant documents, and produced those documents in strict compliance with their disclosure obligations. *Id.* at 5-6. Turning to the allegedly deceptive CFL Group 1 representative product, ULT contends that each of LBC’s many accusations “is flat-out false.” *Id.* at 6. ULT contends that LBC actually proposed use of the subject product, and that LBC did so with full knowledge of how it worked and as to how it is different from other

CFL Group 1 products. *Id.* According to ULT, Dr. Roberts tested a different CFL Group 1 product, resulting in different test results. *Id.* Moreover, ULT disputes LBC's claim that the product is "defective," noting that the ballasts tested by Mr. Burke and Dr. Roberts date from 2007, over two years after the subject product's defect was discovered and corrected. *Id.* at 7-8.

Next, ULT takes issue with LBC's attempts to "disparage" Mr. Berry as "unqualified." *Id.* at 8. ULT argues that it did not "shield" Mr. Berry, listing him on the first page of each witness list and disclosing that he made determinations for ULT regarding the '529 patent. *Id.* at 9. Moreover, regarding the issue of a deposition, ULT notes that LBC never requested such a deposition even after Mr. Poehlman testified at his deposition that Mr. Berry had led the investigation into the accused products and the '529 patent. *Id.*

ULT also argues that LBC's own misconduct weighs against deeming this an "exceptional case" and granting an award of attorney's fees. *Id.* at 10. ULT contends that LBC refused to drop meritless claims in a timely manner, engaging both parties and the Court in vexatious litigation on frivolous claims. *Id.* at 11. Further, LBC filed untimely contentions and expert opinions, including an attempt to disclose an entirely new opinion regarding the Linear Group 3 ballasts in open court. *Id.* at 12. ULT also highlights the alleged misstatements in LBC's Motion for Entry of Judgment as evidence of LBC's own misconduct. *Id.*

Reviewing the extant evidence regarding ULT's alleged litigation misconduct, the Court finds insufficient evidence to deem this case "exceptional." To the extent such conduct exists, specifically in the form of dilatory production, the Court finds such delayed production counter-balanced by LBC's delay in producing contentions and their virtually rolling additions to Dr. Roberts' expert report. As for the remaining grounds, the Court finds that none of them are well

taken. The “Hesterman Documents” came to light before trial, and ULT produced them almost immediately. There is no evidence that Mr. Berry was shielded from LBC, and LBC freely and consistently argued to the jury that Mr. Berry was unqualified. LBC’s allegations that Mr. Berry destroyed documents illicitly or inappropriately formed the basis of their requested spoliation instruction, which the Court denied. The rhetoric regarding Mr. Berry’s allegedly improper destruction of documents is simply not borne out by the facts. Turning to the CFL Group 1 representative product, the Court finds that the evidence adduced at trial clearly showed that the defect in the representative product came to light, and was fixed, in 2005. While LBC continuously argued to the jury that ULT had duped everyone, their own expert included, in arguing for a finding of wilfulness, the jury was apparently not convinced. Neither is the Court. The record clearly shows that the parties were on notice regarding the nature of the representative product, and that the fixed defect had no bearing on any tests.

In sum, the overblown rhetoric LBC used in trial, and again in their briefs seeking fees, simply does not accord with the parties’ actual conduct during the course of this litigation. As such, the Court declines to deem this case “exceptional” and, accordingly, denies LBC’s request for fees.

V. CONCLUSION

Accordingly, ULT’s Motion for Judgment as a Matter of Law should be and is hereby **DENIED**, and LBC’s Motion for Entry of Judgment is **GRANTED** in part and **DENIED** in part.

It is therefore **ORDERED** that the damages verdict of \$3,000,000.00 stands and represents a lump-sum royalty payment. It is further **ORDERED** that the Court awards prejudgment interest from the date of first infringement at the Texas statutory rate of 5%, compounded annually, amounting to \$1,543,479.20, bringing the total award to \$4,543,479.20, and post-judgment interest

from the date of judgment at the rate set by 28 U.S.C. § 1961.

SO ORDERED on this **26th day of August, 2011.**


Reed O'Connor
UNITED STATES DISTRICT JUDGE

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION**

**LIGHTING BALLAST CONTROL,
LLC,**

Plaintiff,

v.

**PHILIPS ELECTRONICS NORTH
AMERICA CORP., et al.,**

Defendants.

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CIVIL ACTION NO. 7:09-CV-29-O

FINAL JUDGMENT

This Court has entered its Memorandum Opinion & Order **GRANTING** in part and **DENYING** in part ULT's Motion for Judgment as a Matter of Law, and **GRANTING** in part and **DENYING** in part LBC's Motion for Entry of Judgment

It is therefore **ORDERED** that the damages verdict of \$3,000,000.00 stands and represents a lump-sum royalty payment. It is further **ORDERED** that the Court awards prejudgment interest from the date of first infringement at the Texas statutory rate of 5%, compounded annually, amounting to \$1,543,479.20 in interest, bringing the total award to \$4,543,479.20. It is further **ORDERED** that the Court awards post-judgment interest from the date of judgment at the rate set by 28 U.S.C. § 1961 as of the date of judgment. It is further **ORDERED** that ULT's counter-claim for declaratory relief is hereby **DISMISSED** with prejudice pursuant to the verdict and the Court's Memorandum Opinion & Order. It is further **ORDERED** that all other relief not specifically referenced herein, and all pending motions, are hereby **DENIED** and **DISMISSED** pursuant to this Final Judgment.

SO ORDERED on this **25th day of August, 2011.**

APPEAL, CLOSED, EXH-ADM, JURY, ROACH

**U.S. District Court
Northern District of Texas (Wichita Falls)
CIVIL DOCKET FOR CASE #: 7:09-cv-00029-O**

Lighting Ballast Control LLC v. Advance Transformer
Co. et al
Assigned to: Judge Reed C O'Connor
Cause: 15:1126 Patent Infringement

Date Filed: 02/24/2009
Date Terminated: 08/26/2011
Jury Demand: Both
Nature of Suit: 830 Patent
Jurisdiction: Federal Question

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Date Filed	#	Docket Text
02/24/2009	<u>1</u>	COMPLAINT WITH JURY DEMAND against all defendants filed by Lighting Ballast Control LLC. Clerk to issue summons(es). (Filing fee

		\$350; Receipt number 0539000000002602967) (Attachments: # <u>1</u> Exhibit A, # <u>2</u> Civil Cover Sheet) (Suder, Jonathan) (Entered: 02/24/2009)
02/24/2009	<u>2</u>	CERTIFICATE OF INTERESTED PERSONS/DISCLOSURE STATEMENT by Lighting Ballast Control LLC identifying Corporate Parent/Other Affiliate Acacia Patent Acquisition LLC, Corporate Parent/Other Affiliate Acacia Research Corporation for Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 02/24/2009)
02/24/2009	<u>3</u>	NOTICE of Attorney Appearance by David A Skeels on behalf of Lighting Ballast Control LLC. (Skeels, David) (Entered: 02/24/2009)
02/24/2009	<u>4</u>	Summons Issued as to Advance Transformer Co., Fulham Co., Inc., General Electric Company, Universal Lighting Technologies, Inc. (ttm) (Entered: 02/24/2009)
03/12/2009	<u>5</u>	NOTICE of Attorney Appearance by Jeffrey L Cureton on behalf of Lighting Ballast Control LLC. (Cureton, Jeffrey) (Entered: 03/12/2009)
03/19/2009	<u>6</u>	NOTICE of Attorney Appearance by Trey Yarbrough, III on behalf of Advance Transformer Co.. (Yarbrough, Trey) (Entered: 03/19/2009)
03/19/2009	<u>7</u>	Unopposed Motion for Extension of Time to File Answer filed by Advance Transformer Co. (Yarbrough, Trey) (Entered: 03/19/2009)
03/20/2009	<u>8</u>	SUMMONS Returned Executed as to Universal Lighting Technologies, Inc. ; served on 2/28/2009. (Suder, Jonathan) (Entered: 03/20/2009)
03/23/2009	<u>9</u>	ORDER granting <u>7</u> Motion for Extension of Time to File Answer re <u>7</u> Unopposed Motion for Extension of Time to File Answer Advance Transformer Co. answer due 4/20/2009. (Ordered by Judge Reed C O'Connor on 3/23/2009) (aps) (Entered: 03/23/2009)
03/26/2009	<u>10</u>	ANSWER to <u>1</u> Complaint, filed by Universal Lighting Technologies, Inc., COUNTERCLAIM against Lighting Ballast Control LLC filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 03/26/2009)
03/27/2009	<u>11</u>	CERTIFICATE OF INTERESTED PERSONS/DISCLOSURE STATEMENT by Universal Lighting Technologies, Inc.. (Sterling, Deborah) (Entered: 03/27/2009)
03/30/2009	<u>12</u>	CERTIFICATE OF INTERESTED PERSONS/DISCLOSURE STATEMENT by Advance Transformer Co. identifying Corporate Parent/Other Affiliate Philips Electronics North America Corporation for Advance Transformer Co.. (Yarbrough, Trey) (Entered: 03/30/2009)
04/20/2009	<u>13</u>	Unopposed Motion for Extension of Time to File Answer <i>Defendant's Unopposed Second Motion for Extension of Time in Which to Answer,</i>

		<i>Move or Otherwise Respond to Plaintiff's Original Complaint</i> filed by Advance Transformer Co. (Yarbrough, Trey) (Entered: 04/20/2009)
04/21/2009	<u>14</u>	ORDER granting <u>13</u> Motion for Extension of Time to File Answer. (Ordered by Judge Reed C O'Connor on 4/21/09) (ttm) (Entered: 04/22/2009)
04/22/2009	<u>15</u>	NOTICE of Attorney Appearance by E Glenn Thames on behalf of Fulham Co., Inc.. (Thames, E) (Entered: 04/22/2009)
04/22/2009	<u>16</u>	Unopposed Motion for Extension of Time to File Answer filed by Fulham Co., Inc. (Attachments: # <u>1</u> Text of Proposed Order) (Thames, E) (Entered: 04/22/2009)
04/23/2009	<u>17</u>	ANSWER to Counterclaim filed by Lighting Ballast Control LLC. Related document: <u>10</u> Answer to Complaint, Counterclaim (Suder, Jonathan) (Entered: 04/23/2009)
04/24/2009	<u>18</u>	ORDER granting <u>16</u> Motion for Extension of Time to File Answer Fulham Co., Inc. answer due 5/22/2009. (Ordered by Judge Reed C O'Connor on 4/24/2009) (aps) (Entered: 04/24/2009)
04/24/2009	<u>19</u>	Application and Order for Admission Pro Hac Vice by Mark J Patterson for Universal Lighting Technologies, Inc. (Ordered by Judge Reed C O'Connor on 4/24/09) (dnc) (Entered: 04/27/2009)
04/24/2009	<u>20</u>	Application and Order for Admission Pro Hac Vice by Gary L Montle for Universal Lighting Technologies, Inc. (Ordered by Judge Reed C O'Connor on 4/24/09) (dnc) (Entered: 04/27/2009)
04/24/2009	<u>21</u>	Application and Order for Admission Pro Hac Vice by John F Triggs for Universal Lighting Technologies, Inc. (Ordered by Judge Reed C O'Connor on 4/24/09) (dnc) (Entered: 04/27/2009)
05/20/2009	<u>22</u>	ANSWER to <u>1</u> Complaint, with Jury Demand filed by Advance Transformer Co., COUNTERCLAIM against Lighting Ballast Control LLC filed by Advance Transformer Co. (Yarbrough, Trey) (Entered: 05/20/2009)
05/22/2009	<u>23</u>	Second Motion for Extension of Time to File Answer (<i>Unopposed</i>) filed by Fulham Co., Inc. (Attachments: # <u>1</u> Text of Proposed Order - copy emailed to Judge O'Connor) (Thames, E) (Entered: 05/22/2009)
05/22/2009	<u>24</u>	ORDER: Accordingly, the Court orders that Plaintiff shall complete service upon Defendant General Electric Company by June 1, 2009, and file proof of such service within three days of completing service. (Ordered by Judge Reed C O'Connor on 5/22/2009) (aps) Modified on 5/26/2009 (ttm). (Entered: 05/22/2009)
05/26/2009	<u>25</u>	SUMMONS Returned Executed as to General Electric Company ;

		served on 3/2/2009. (Suder, Jonathan) (Entered: 05/26/2009)
05/28/2009	<u>26</u>	ORDER granting <u>23</u> Motion for Extension of Time to File Answer Fulham Co., Inc. answer due 6/22/2009. (Ordered by Judge Reed C O'Connor on 5/28/09) (ttm) (Entered: 05/28/2009)
06/02/2009	<u>27</u>	Unopposed MOTION to Extend Time to Answer, Move or Otherwise Respond to Plaintiff's Original Complaint(), Motion for Extension of Time to File Answer filed by Lighting Ballast Control LLC (Skeels, David) (Entered: 06/02/2009)
06/03/2009	<u>28</u>	ORDER granting <u>27</u> Motion to Extend Time. It is, therefore, ORDERED that Defendant General Electric Company shall answer, move, or otherwise respond to Plaintiffs Original Complaint on or before June 26, 2009. (Ordered by Judge Reed C O'Connor on 6/3/2009) (aps) (Entered: 06/03/2009)
06/12/2009	<u>29</u>	<i>Plaintiff's Answer to Defendant Advance Transformer Co.'s Counterclaims</i> filed by Lighting Ballast Control LLC. Related document: <u>22</u> Answer to Counterclaim (Skeels, David) Modified on 6/17/2009 (ttm). (Entered: 06/12/2009)
06/22/2009	<u>30</u>	ANSWER to <u>1</u> Complaint, with Jury Demand filed by Fulham Co., Inc. (Thames, E) (Entered: 06/22/2009)
06/22/2009	<u>31</u>	CERTIFICATE OF INTERESTED PERSONS/DISCLOSURE STATEMENT by Fulham Co., Inc.. (Thames, E) (Entered: 06/22/2009)
06/26/2009	<u>32</u>	Unopposed Motion for Extension of Time to File Answer <i>for Defendant General Electric Company</i> filed by Lighting Ballast Control LLC (Skeels, David) (Entered: 06/26/2009)
06/29/2009	<u>33</u>	ORDER ON UNOPPOSED MOTION FOR EXTENSION OF TIME FOR DEFENDANT GENERAL ELECTRIC COMPANY TO ANSWER, MOVE OR OTHERWISE RESPOND TO PLAINTIFFS ORIGINAL COMPLAINT granting <u>32</u> Motion for Extension of Time to File Answer re <u>32</u> Unopposed Motion for Extension of Time to File Answer <i>for Defendant General Electric Company</i> General Electric Company answer due 7/10/2009. (Ordered by Judge Reed C O'Connor on 6/29/09) (ttm) (Entered: 06/30/2009)
07/13/2009	<u>34</u>	NOTICE of Settlement with Defendant General Electric Company filed by Lighting Ballast Control LLC (Skeels, David) (Entered: 07/13/2009)
07/14/2009	<u>35</u>	ORDER REQUIRING SCHEDULING CONFERENCE AND REPORT FOR CONTENTS OF SCHEDULING ORDER Proposed Scheduling Order due by 8/28/2009. See order for further specifics. (Ordered by Judge Reed C O'Connor on 7/14/09) (ttm) (Entered: 07/14/2009)
07/14/2009	<u>36</u>	ORDER: Plaintiff and Defendant General Electric Company are

		therefore directed to file the appropriate dismissal papers (a stipulation of dismissal under FED. R. CIV. P. 41(a)(1)(A)(i), or an agreed motion to dismiss with corresponding proposed order) with the Clerks Office no later than 5:00 p.m. on Thursday, August 13, 2009. If a stipulation of dismissal is not filed by August 13, 2009 and further action is necessary or desirable with respect to Defendant General Electric Company, the parties should immediately file a Joint Status Report with this Court. (Ordered by Judge Reed C O'Connor on 7/14/09) (ttm) (Entered: 07/15/2009)
08/04/2009	<u>37</u>	NOTICE of Dismissal with Prejudice as to Defendant General Electric Company filed by Lighting Ballast Control LLC (Skeels, David) (Entered: 08/04/2009)
08/13/2009	<u>38</u>	Application and Order for Admission Pro Hac Vice by John R Inge for Universal Lighting Technologies, Inc. (Ordered by Judge Reed C O'Connor on 8/12/09) (dnc) (Entered: 08/14/2009)
08/13/2009	<u>39</u>	Application and Order for Admission Pro Hac Vice by Sten Jensen for Universal Lighting Technologies, Inc. (Ordered by Judge Reed C O'Connor on 8/12/09) (dnc) (Entered: 08/14/2009)
08/13/2009	<u>40</u>	Application and Order for Admission Pro Hac Vice by Steve Routh for Universal Lighting Technologies, Inc. (Ordered by Judge Reed C O'Connor on 8/12/09) (dnc) (Entered: 08/14/2009)
08/28/2009	<u>41</u>	NOTICE of Rule 26(a)(1) Initial Disclosures filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 08/28/2009)
08/28/2009	<u>42</u>	Joint STATUS REPORT Regarding Contents of Scheduling Order filed by Advance Transformer Co., Fulham Co., Inc., Universal Lighting Technologies, Inc., Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 08/28/2009)
09/02/2009	<u>43</u>	NOTICE of Initial Disclosures Pursuant to Fed.R.Civ.P. 26 filed by Fulham Co., Inc. (Thames, E) (Entered: 09/02/2009)
09/02/2009	<u>44</u>	NOTICE of Initial Disclosures filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 09/02/2009)
09/14/2009	<u>45</u>	Unopposed MOTION to Substitute Attorney. Added attorney Sten Jensen and Deborah L Sterling for Universal Lighting Technologies, Inc., John R Inge and Deborah L Sterling for Universal Lighting Technologies, Inc.. Motion filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 09/14/2009)
09/15/2009	<u>46</u>	NOTICE of Disclosures Pursuant to P.R. 3-1 and 3-2 filed by Lighting Ballast Control LLC (Skeels, David) (Entered: 09/15/2009)
09/23/2009	<u>47</u>	NOTICE of Initial Disclosures filed by Advance Transformer Co.

		(Yarbrough, Trey) (Entered: 09/23/2009)
09/23/2009	<u>48</u>	Unopposed MOTION to Substitute Party filed by Lighting Ballast Control LLC. Party PHILIPS ELECTRONICS NORTH AMERICA CORPORATION added. (Skeels, David) (Entered: 09/23/2009)
10/16/2009	<u>49</u>	SCHEDULING ORDER: Amended Pleadings due by 2/5/2010. Motions due by 9/6/2010. Discovery due by 8/6/2010. Pretrial Materials due by 12/20/2010. This case is set for jury trial on this Courts four-week docket beginning January 4, 2011. Counsel and the parties shall be ready for trial on two days notice at any time during this four-week period. *** See order for further specifics *** (Ordered by Judge Reed C O'Connor on 10/16/2009) (aps) (Entered: 10/16/2009)
10/26/2009	<u>50</u>	ORDER granting <u>48</u> Motion to Substitute Party. Philips Electronics North America Corporation, Defendant and Philips Electronics North America Corporation, Counter-Defendant added. Advance Transformer Co., Defendant and Advance Transformer Co., Counter-Defendant terminated (Ordered by Judge Reed C O'Connor on 10/26/09) (ttm) (Entered: 10/26/2009)
10/26/2009	<u>51</u>	ORDER granting <u>45</u> Motion to Substitute Attorney. (Ordered by Judge Reed C O'Connor on 10/26/09) (ttm) (Entered: 10/26/2009)
11/25/2009	<u>52</u>	Unopposed MOTION For Leave to Appear Without Local Counsel as Defined Under L.R. 83.10(a) filed by Philips Electronics North America Corporation (Yarbrough, Trey) (Entered: 11/25/2009)
12/14/2009	<u>53</u>	NOTICE of Compliance on Invalidity Contentions filed by Philips Electronics North America Corporation (Yarbrough, Trey) (Entered: 12/14/2009)
12/15/2009	<u>54</u>	NOTICE of Compliance Regarding Service of Invalidity Contentions and Documents filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 12/15/2009)
12/21/2009	<u>55</u>	Joint MOTION to Extend Time for Designation of Expert Witnesses filed by Philips Electronics North America Corporation, Advance Transformer Co., Fulham Co., Inc., Universal Lighting Technologies, Inc., Lighting Ballast Control LLC, General Electric Company (Skeels, David) (Entered: 12/21/2009)
12/22/2009	<u>56</u>	Application for Admission Pro Hac Vice of Attorney John Mulcahy (Filing fee \$25; Receipt number 0539000000003050638) filed by Philips Electronics North America Corporation (Yarbrough, Trey) (Entered: 12/22/2009)
12/23/2009	<u>57</u>	STIPULATION OF DISMISSAL as to Defendant Fulham Co., Inc. by Lighting Ballast Control LLC. (Skeels, David) (Entered: 12/23/2009)

01/12/2010	<u>58</u>	ORDER ON JOINT MOTION FOR EXTENSION OF TIME FOR DESIGNATION OF EXPERT WITNESSES AND WITNESS REPORTS granting <u>55</u> Motion to Extend Time. See order for specifics. (Ordered by Judge Reed C O'Connor on 1/12/2010) (ttm) (Entered: 01/12/2010)
01/12/2010	<u>59</u>	ORDER granting <u>52</u> Motion to proceed without local counsel. The Court reminds counsel of the duty to abide by all local rules of this court and the standards of litigation conduct set forth in Dondi Properties Corporation v. Commerce Savings and Loan Association, 121 F.R.D. 284 (N.D. Tex. 1988). The Court further advises that if proceeding without local counsel disrupts this litigation or otherwise results in failure to comply with the rules of this court, Defendant will be required to immediately obtain local counsel. (Ordered by Judge Reed C O'Connor on 1/12/2010) (ttm) (Entered: 01/13/2010)
01/14/2010	<u>61</u>	ORDER:, Application and Order for Admission Pro Hac Vice by Vincent P Kovalick for Philips Electronics North America Corporation (Ordered by Judge Reed C O'Connor on 1/14/2010) (ttm) (Entered: 01/19/2010)
01/15/2010	<u>60</u>	NOTICE of Disclosures Under Northern District of Texas Misc. Order 62, Paragraph 4-1 filed by Lighting Ballast Control LLC (Skeels, David) (Entered: 01/15/2010)
01/27/2010		ORDER denying <u>56</u> Application for Admission Pro Hac Vice. An attorney seeking pro hac vice admission must apply for admission on an approved form. See LR 83.9(b). The fee paid (filing fee \$25) will be applied to the corrected PHV form. The form is available on the Court's web site at http://www.txnd.uscourts.gov/pdf/atty_handbook/PROHACVC.pdf . (Ordered by Judge Reed C O'Connor on 1/27/2010) (fam) (Entered: 01/27/2010)
01/29/2010	<u>62</u>	Application for Admission Pro Hac Vice of Attorney John Mulcahy (Filing fee \$25; Receipt number 0539000000003050638) filed by Philips Electronics North America Corporation. The fee paid (filing fee \$25) in document #26 is applied to this corrected PHV form per electronic order entered 1/27/2010. (ttm) (Entered: 01/29/2010)
02/01/2010		ORDER granting <u>62</u> Application for Admission Pro Hac Vice. Clerk shall deposit application fee to the Non-Appropriated Fund of this Court. If not already done, Applicant must register as an ECF User within 14 days (LR 5.1(f)). (Ordered by Judge Reed C O'Connor on 2/1/2010) (fam) (Entered: 02/01/2010)
02/01/2010	<u>63</u>	Joint MOTION for Protective Order filed by Philips Electronics North America Corporation, Universal Lighting Technologies, Inc., Lighting

		Ballast Control LLC (Attachments: # <u>1</u> Exhibit A) (Sterling, Deborah) (Entered: 02/01/2010)
02/02/2010	<u>64</u>	ORDER granting <u>63</u> Motion for Protective Order (Ordered by Judge Reed C O'Connor on 2/2/2010) (ttm) (Entered: 02/02/2010)
02/02/2010	<u>65</u>	STIPULATED PROTECTIVE ORDER. See Order for specifics. (Ordered by Judge Reed C O'Connor on 2/2/2010) (ttm) (Entered: 02/02/2010)
02/05/2010	<u>66</u>	Unopposed MOTION for Leave to File Amended Answer filed by Universal Lighting Technologies, Inc. (Attachments: # <u>1</u> Exhibit A) (Sterling, Deborah) (Entered: 02/05/2010)
02/05/2010	<u>67</u>	Brief/Memorandum in Support filed by Universal Lighting Technologies, Inc. re <u>66</u> Unopposed MOTION for Leave to File Amended Answer (Sterling, Deborah) (Entered: 02/05/2010)
02/05/2010	<u>68</u>	NOTICE of Compliance with P.R. 4-2 filed by Lighting Ballast Control LLC (Skeels, David) (Entered: 02/05/2010)
02/08/2010	<u>69</u>	ORDER GRANTING UNIVERSAL LIGHTING TECHNOLOGIES, INC.S UNOPPOSED MOTION FOR LEAVE TO AMEND ITS ANSWER, AFFIRMATIVE DEFENSES, AND COUNTERCLAIM granting <u>66</u> Motion for Leave to File. ULT shall file its Amended Answer, Affirmative Defenses and Counterclaim on the docket no later than 5:00 p.m. February 10, 2010. (Ordered by Judge Reed C O'Connor on 2/8/2010) (ttm) (Entered: 02/08/2010)
02/08/2010	<u>70</u>	AMENDED ANSWER to <u>1</u> Complaint, with Jury Demand filed by Universal Lighting Technologies, Inc., COUNTERCLAIM against Lighting Ballast Control LLC filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 02/08/2010)
02/11/2010	<u>71</u>	NOTICE of Compliance with PR 4-2 filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 02/11/2010)
02/19/2010	<u>72</u>	ANSWER to Counterclaim filed by Lighting Ballast Control LLC. Related document: <u>70</u> Amended Answer to Complaint, Counterclaim (Skeels, David) (Entered: 02/19/2010)
03/12/2010	<u>73</u>	NOTICE of Subpoena Duces Tecum to Andrzej Bobel filed by Philips Electronics North America Corporation, Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 03/12/2010)
03/12/2010	<u>74</u>	NOTICE of Subpoena Duces Tecum to Motorola, Inc. filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 03/12/2010)
03/12/2010	<u>75</u>	NOTICE of Subpoena Duces Tecum to Osram Sylvania Inc. filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 03/12/2010)

		03/12/2010)
03/15/2010	<u>76</u>	Joint MOTION to Extend Time to File Joint Claim Construction and Prehearing Statement filed by Lighting Ballast Control LLC (Attachments: # <u>1</u> Text of Proposed Order) (Skeels, David) (Entered: 03/15/2010)
03/15/2010	<u>77</u>	ORDER granting <u>76</u> Motion to Extend Time. Having considered the Motion, and finding that good cause exists and the relief sought is justified, it is hereby ORDERED that the parties file their Joint Claim Construction and Prehearing Statement on March 22, 2010. (Ordered by Judge Reed C O'Connor on 3/15/2010) (ttm) (Entered: 03/15/2010)
03/22/2010	<u>78</u>	NOTICE of filing of Joint Claim Construction and Prehearing Statement filed by Lighting Ballast Control LLC (Attachments: # <u>1</u> Exhibit A, # <u>2</u> Exhibit B) (Skeels, David) (Entered: 03/22/2010)
03/26/2010	<u>79</u>	NOTICE OF FILING OF AMENDED JOINT CLAIM CONSTRUCTION AND PREHEARING STATEMENT re: <u>78</u> Notice (Other) filed by Lighting Ballast Control LLC (Attachments: # <u>1</u> Exhibit A, # <u>2</u> Exhibit B) (Skeels, David) (Entered: 03/26/2010)
04/05/2010	<u>80</u>	AFFIDAVIT of Service for Subpoena To Testify at Deposition served on Motorola, Inc. on 3/12/2010. (Sterling, Deborah) (Entered: 04/05/2010)
04/05/2010	<u>81</u>	AFFIDAVIT of Service for Subpoena to Testify at Deposition served on Osram Sylvania on 3/12/2010. (Sterling, Deborah) (Entered: 04/05/2010)
04/30/2010	<u>82</u>	Unopposed MOTION to Withdraw as Attorney <i>Jeffrey L. Cureton</i> filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 04/30/2010)
05/03/2010	<u>83</u>	ELECTRONIC ORDER granting <u>82</u> Motion to Withdraw as Attorney. Attorney Jeffrey L Cureton terminated. (Ordered by Judge Reed C O'Connor on 5/3/2010) (chmb)(cny) (Entered: 05/03/2010)
05/06/2010	<u>84</u>	Brief/Memorandum in Support filed by Lighting Ballast Control LLC re <u>49</u> Scheduling Order, <i>Plaintiff's Opening Brief on Claim Construction</i> (Attachments: # <u>1</u> Exhibit(s) 1, # <u>2</u> Exhibit(s) 2, # <u>3</u> Exhibit(s) 2A, # <u>4</u> Exhibit(s) 2B, # <u>5</u> Exhibit(s) 2C, # <u>6</u> Exhibit(s) 2D, # <u>7</u> Exhibit(s) 3, # <u>8</u> Exhibit(s) 4) (Suder, Jonathan) (Entered: 05/06/2010)
05/20/2010	<u>87</u>	RESPONSE filed by Lighting Ballast Control LLC re: <u>85</u> Sealed Document (Suder, Jonathan) (Entered: 05/20/2010)
05/20/2010	<u>88</u>	Appendix in Support filed by Lighting Ballast Control LLC re <u>87</u> Response/Objection (Suder, Jonathan) (Entered: 05/20/2010)

05/20/2010	<u>89</u>	RESPONSE filed by Philips Electronics North America Corporation, Universal Lighting Technologies, Inc. re: <u>84</u> Brief/Memorandum in Support of Motion, (Sterling, Deborah) (Entered: 05/20/2010)
05/20/2010	<u>90</u>	Appendix in Support filed by Philips Electronics North America Corporation, Universal Lighting Technologies, Inc. re <u>89</u> Response/Objection (Attachments: # <u>1</u> Exhibit(s) to Appendix) (Sterling, Deborah) (Entered: 05/20/2010)
05/21/2010	<u>91</u>	Alternative Dispute Resolution Summary filed by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc.. Attorneys in Attendance: Jonathan Suder, Steven Routh, Brenda Cubbage, and Diana Szego. Prv Fee: \$ \$5,000.00. Outcome of ADR: Continuing to work with parties to reach a settlement. (Sterling, Deborah) (Entered: 05/21/2010)
05/21/2010	<u>92</u>	NOTICE <i>Mediation Report for Plaintiff Lighting Ballast Control LLC and Philips Electronics North America Corporation</i> filed by Lighting Ballast Control LLC (Skeels, David) (Entered: 05/21/2010)
05/24/2010	<u>93</u>	Alternative Dispute Resolution Summary filed by Christopher Nolland. Attorneys in Attendance: Jonathan Suder, David Skeels, Steven Routh, Diana Szego, Brenda Cubbage, Vincent Kovalick. Prv Fee: \$ 10,000.00. Outcome of ADR: Settled in part, as a result of ADR. (Nolland, Christopher) (Entered: 05/24/2010)
06/03/2010	<u>94</u>	Unopposed MOTION for Extension of Time to File Claim Construction Chart filed by Lighting Ballast Control LLC (Skeels, David) (Entered: 06/03/2010)
06/03/2010	<u>95</u>	ELECTRONIC ORDER granting <u>94</u> Motion for Extension of Time to File Claim Construction Chart. The June 3, 2010 deadline to file a Claim Construction Chart, as imposed by the October 16, 2009 Scheduling Order, is hereby extended to June 11, 2010. (Ordered by Judge Reed C O'Connor on 6/3/2010) (chmb)(cny) (Entered: 06/03/2010)
06/11/2010	<u>96</u>	NOTICE of Filing of Claim Construction Chart re: <u>49</u> Scheduling Order, filed by Lighting Ballast Control LLC (Attachments: # <u>1</u> Exhibit (s) A) (Skeels, David) (Entered: 06/11/2010)
06/29/2010	<u>97</u>	NOTICE of Settlement filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 06/29/2010)
07/22/2010	<u>98</u>	NOTICE <i>Supplemental Notice of Settlement</i> filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 07/22/2010)
07/28/2010	<u>99</u>	NOTICE of Discovery Extension filed by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 07/28/2010)

		07/28/2010)
08/19/2010	<u>100</u>	Joint MOTION to Extend Time for Dispositive Motions filed by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 08/19/2010)
08/19/2010	<u>101</u>	***VACATED PER <u>107</u> Amended Memorandum Opinion and Order*** Memorandum Opinion and Order. The Court has construed the disputed claim terms after reviewing the briefs and responses of the parties, the applicable law, and where appropriate, any extrinsic evidence submitted by the parties. See Order for specifics. (Ordered by Judge Reed C O'Connor on 8/19/2010) (ttm) Modified on 12/2/2010 (trt). (Entered: 08/19/2010)
08/30/2010	<u>102</u>	MOTION for Reconsideration re <u>101</u> Memorandum Opinion and Order, <i>and Clarification, and Request for Expedited Hearing</i> filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 08/30/2010)
08/31/2010	<u>103</u>	ORDER: Before the Court is Plaintiff's Motion for Reconsideration, ECF No. <u>102</u> . The Court hereby ORDERS Defendant to file its Response on or before 09/07/2010 at 12:00 PM. Plaintiff may file a Reply so long as it is filed on or before 09/09/2010 at 12:00 PM. See Order. (Ordered by Judge Reed C O'Connor on 8/31/2010) (chmb) (acc) (Entered: 08/31/2010)
09/07/2010	<u>104</u>	RESPONSE AND OBJECTION filed by Universal Lighting Technologies, Inc. re: <u>102</u> MOTION for Reconsideration re <u>101</u> Memorandum Opinion and Order, <i>and Clarification, and Request for Expedited Hearing</i> (Attachments: # <u>1</u> Exhibit(s) A and B) (Sterling, Deborah) (Entered: 09/07/2010)
09/09/2010	<u>105</u>	REPLY filed by Lighting Ballast Control LLC re: <u>102</u> MOTION for Reconsideration re <u>101</u> Memorandum Opinion and Order, <i>and Clarification, and Request for Expedited Hearing</i> (Skeels, David) (Entered: 09/09/2010)
10/29/2010	<u>106</u>	ELECTRONIC ORDER: Pending the Court's resolution of Plaintiff's Motion for Reconsideration, ECF No. <u>102</u> , all pending deadlines are vacated. (Ordered by Judge Reed C O'Connor on 10/29/2010) (chmb) (acc) (Entered: 10/29/2010)
12/02/2010	<u>107</u>	Amended Memorandum Opinion and Order re: <u>102</u> Motion for Reconsideration filed by Lighting Ballast Control LLC. Vacating <u>101</u> Memorandum Opinion and Order. See Order for specifics. (Ordered by Judge Reed C O'Connor on 12/2/2010) (trt) (Entered: 12/02/2010)
12/02/2010	<u>108</u>	AMENDED SCHEDULING ORDER Discovery due by 12/17/2010. Motions due by 1/7/2011. Pretrial Materials due by 3/25/2011. This case is set for jury trial on this Courts four-week docket beginning April 4,

		2011 in US Courthouse, Courtroom 222, 1000 Lamar Street, Wichita Falls, TX 76301-3431 before Judge Reed C O'Connor. Counsel and the parties shall be ready for trial on two days notice at any time during this four-week period. See order for further specifics. (Ordered by Judge Reed C O'Connor on 12/2/2010) (plp) (Entered: 12/03/2010)
12/06/2010	<u>109</u>	STIPULATION OF DISMISSAL <i>with Prejudice as to Defendant Philips Electronics North America Corporation</i> by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 12/06/2010)
12/10/2010	<u>110</u>	Emergency MOTION To Modify Amended Scheduling Order re <u>108</u> Scheduling Order,, filed by Lighting Ballast Control LLC with Brief/Memorandum in Support. (Skeels, David) (Entered: 12/10/2010)
12/10/2010	<u>111</u>	RESPONSE filed by Universal Lighting Technologies, Inc. re: <u>110</u> Emergency MOTION To Modify Amended Scheduling Order re <u>108</u> Scheduling Order,, (Sterling, Deborah) (Entered: 12/10/2010)
12/10/2010	<u>112</u>	Meet & Confer Order: The parties must make a good faith effort to agree among themselves on these deadlines and file their Joint Report for Proposed Scheduling Order on or before Friday, December 24, 2010. The Court is vacating the current deadlines as a courtesy to the parties in the hope that they can come to a reasonable agreement on scheduling for the remainder of this case. See order for further specifics. (Ordered by Judge Reed C O'Connor on 12/10/2010) (plp) (Main Document 112 replaced on 12/10/2010) (plp). (Entered: 12/10/2010)
12/23/2010	<u>113</u>	Proposal for contents of scheduling and discovery order <i>jointly filed</i> by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc.. (Sterling, Deborah) (Entered: 12/23/2010)
12/27/2010	<u>114</u>	FINAL SCHEDULING ORDER Discovery due by 2/18/2011. Motions due by 2/18/2011. Pretrial Order due by 4/25/2011. Pretrial Materials due by 4/25/2011. Jury Trial set for 5/2/2011 10:00 AM in US Courthouse, Courtroom 222, 1000 Lamar Street, Wichita Falls, TX 76301-3431 before Judge Reed C O'Connor. See order for further specifics. (Ordered by Judge Reed C O'Connor on 12/27/2010) (plp) (Entered: 12/27/2010)
01/24/2011	<u>115</u>	Unopposed MOTION To Begin Trial No Earlier Than May 9, 2011 filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 01/24/2011)
01/24/2011	<u>116</u>	NOTICE of Rule 26(a)(2) Disclosures filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 01/24/2011)
01/25/2011	<u>117</u>	NOTICE of Rule 26(a) Disclosures filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 01/25/2011)

01/28/2011	<u>118</u>	Joint MOTION to Extend Time Dispositive Motion Deadline filed by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 01/28/2011)
01/28/2011	<u>119</u>	NOTICE of Rule 26(a)(2)(C) Disclosures filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 01/28/2011)
01/31/2011	<u>120</u>	ORDER granting <u>118</u> Motion to Extend Time. Motions due by 2/25/2011. Replies due by 3/16/2011. Responses due by 3/11/2011. See Order for further specifics. (Ordered by Judge Reed C O'Connor on 1/31/2011) (trt) (Entered: 01/31/2011)
02/01/2011	<u>121</u>	ORDER granting <u>115</u> UNOPPOSED MOTION TO BEGIN TRIAL NO EARLIER THAN MAY 9, 2011. Before the Court is Plaintiff's Unopposed Motion to Begin Trial no Earlier Than May 9, 2011, ECF No. 115. Based on the reasons articulated in Plaintiff's Motion, the Court finds that good cause exists for the granting of the Motion. Accordingly, it is hereby ORDERED that this case will remain on the Court's May 2011 jury trial docket, but that the trial will not begin before May 9, 2011. Signed on this 1st day of February, 2011. (Ordered by Judge Reed C O'Connor on 2/1/2011) (plp) (Entered: 02/02/2011)
02/08/2011	<u>122</u>	NOTICE of Rule 26(a)(2)(B) Disclosures filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 02/08/2011)
02/08/2011	<u>123</u>	NOTICE of Rule 26(a)(2)(B) Disclosures filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 02/08/2011)
02/11/2011	<u>124</u>	Application for Admission Pro Hac Vice with Cert. of Good Standing for Attorney T. Vann Pearce, Jr. (Filing fee \$25; Receipt number 0539-3714635) filed by Universal Lighting Technologies, Inc. (Attachments: # <u>1</u> Proposed Order, # <u>2</u> Certificate of Good Standing) (Pearce, Timothy) (Entered: 02/11/2011)
02/25/2011	<u>125</u>	Application for Admission Pro Hac Vice with Cert. of Good Standing for Attorney Diana Szego (Filing fee \$25; Receipt number 0539-3739801) filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 02/25/2011)
02/25/2011	<u>126</u>	MOTION for Summary Judgment or Partial Summary Judgment filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 02/25/2011)
02/26/2011	<u>128</u>	ELECTRONIC ORDER granting ECF No. <u>124</u> Application for Admission Pro Hac Vice of T. Vann Pearce, Jr. Clerk shall deposit application fee to the Non-Appropriated Fund of this Court. If not already done, Applicant must register as an ECF User within 14 days (LR 5.1(f)). (Ordered by Judge Reed C O'Connor on 2/26/2011) (chmb) (acc) (Entered: 02/26/2011)

02/26/2011	<u>129</u>	ELECTRONIC ORDER granting ECF No. <u>125</u> Application for Admission Pro Hac Vice of Diana Szego. Clerk shall deposit application fee to the Non-Appropriated Fund of this Court. If not already done, Applicant must register as an ECF User within 14 days (LR 5.1(f)). (Ordered by Judge Reed C O'Connor on 2/26/2011) (chmb) (acc) (Entered: 02/26/2011)
03/04/2011	<u>130</u>	MOTION to Strike <i>Expert Testimony of Dr. Michael Giesselmann and Expert Testimony of ULT's Seventeen "Non-Retained Experts"</i> filed by Lighting Ballast Control LLC with Brief/Memorandum in Support. (Skeels, David) (Entered: 03/04/2011)
03/04/2011	<u>132</u>	MOTION to Strike <i>Limit or Exclude Certain Expert Testimony</i> filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) . (Entered: 03/04/2011)
03/11/2011	<u>134</u>	OBJECTION filed by Lighting Ballast Control LLC re: <u>126</u> MOTION for Summary Judgment <i>or Partial Summary Judgment</i> (Attachments: # <u>1</u> Exhibit(s) 1) (Suder, Jonathan) (Entered: 03/11/2011)
03/16/2011	<u>139</u>	RESPONSE filed by Universal Lighting Technologies, Inc. re: <u>134</u> Response/Objection (Attachments: # <u>1</u> Declaration(s)) (Sterling, Deborah) (Entered: 03/16/2011)
03/25/2011	<u>141</u>	RESPONSE filed by Universal Lighting Technologies, Inc. re: <u>140</u> Sealed Motion for Leave to File a Sur-Reply (Sterling, Deborah) (Entered: 03/25/2011)
03/30/2011	<u>145</u>	REPLY filed by Lighting Ballast Control LLC re: <u>140</u> MOTION for Leave to File Sur-Reply in Opposition to Defendant's Motion for Summary Judgment (Suder, Jonathan) (Entered: 03/30/2011)
03/30/2011	<u>146</u>	REPLY filed by Lighting Ballast Control LLC re: <u>130</u> MOTION to Strike <i>Expert Testimony of Dr. Michael Giesselmann and Expert Testimony of ULT's Seventeen "Non-Retained Experts"</i> (Suder, Jonathan) (Entered: 03/30/2011)
04/08/2011	<u>147</u>	<i>Fed.R.Civ.P. 26(a)(3)(A)</i> Pretrial Disclosures filed by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 04/08/2011)
04/21/2011	<u>150</u>	Joint MOTION to Extend Time of Certain Deadlines in Final Scheduling Order filed by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc. (Skeels, David) (Entered: 04/21/2011)
04/22/2011	<u>151</u>	ORDER granting ECF No. <u>150</u> Joint Motion to Extend Time. See Order. (Ordered by Judge Reed C O'Connor on 4/22/2011) (chmb) (acc) (Entered: 04/22/2011)
04/25/2011	<u>152</u>	OBJECTION filed by Lighting Ballast Control LLC re: <u>149</u> Sealed and/or Ex Parte Document (Suder, Jonathan) (Entered: 04/25/2011)

04/25/2011	<u>153</u>	Designation of Deposition by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 04/25/2011)
04/25/2011	<u>154</u>	MOTION in Limine filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 04/25/2011)
04/25/2011	<u>155</u>	Proposed Voir Dire by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 04/25/2011)
04/25/2011	<u>156</u>	Witness List by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 04/25/2011)
04/25/2011	<u>157</u>	Exhibit List by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 04/25/2011)
04/25/2011	<u>160</u>	Proposed Voir Dire by Universal Lighting Technologies, Inc.. (Sterling, Deborah) (Entered: 04/25/2011)
04/25/2011	<u>161</u>	OBJECTION filed by Universal Lighting Technologies, Inc. re: <u>147</u> Pretrial Disclosures (Sterling, Deborah) (Entered: 04/25/2011)
04/26/2011	<u>162</u>	TRIAL SCHEDULING ORDER. Jury Trial set for 6/6/2011 10:00 AM in US Courthouse, Courtroom 222, 1000 Lamar Street, Wichita Falls, TX 76301-3431 before Judge Reed C O'Connor. (Ordered by Judge Reed C O'Connor on 4/26/2011) (trt) (Entered: 04/26/2011)
04/26/2011	<u>163</u>	Joint SETTLEMENT CONFERENCE REPORT filed by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc.. (Suder, Jonathan) (Entered: 04/26/2011)
04/29/2011	<u>164</u>	Proposed Jury Charge filed by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 04/29/2011)
04/29/2011	<u>165</u>	Proposed Jury Instructions filed by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 04/29/2011)
04/29/2011	<u>166</u>	Joint MOTION for Leave to File Final Agreed Charge filed by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc. (Suder, Jonathan) (Entered: 04/29/2011)
04/29/2011	<u>167</u>	ELECTRONIC ORDER granting <u>166</u> Motion for Leave to File. (Ordered by Judge Reed C O'Connor on 4/29/2011)(Judge Reed C O'Connor) (Entered: 04/29/2011)
05/03/2011	<u>170</u>	Proposed Jury Instructions filed by Lighting Ballast Control LLC. (Skeels, David) (Entered: 05/03/2011)
05/03/2011	<u>171</u>	Proposed Jury Charge filed by Lighting Ballast Control LLC. (Skeels, David) (Entered: 05/03/2011)
05/04/2011	<u>172</u>	ORDER granting in part and denying in part <u>126</u> Motion for Summary Judgment. ; denying 140 Motion for Leave to File Sur-reply. See Order

A147

		for specifics. (Ordered by Judge Reed C O'Connor on 5/4/2011) (trt) (Entered: 05/04/2011)
05/06/2011	<u>173</u>	Emergency MOTION for Reconsideration re <u>172</u> Order on Motion for Summary Judgment, Order on Motion for Leave to File <i>and Request for Expedited Briefing Thereon</i> filed by Lighting Ballast Control LLC with Brief/Memorandum in Support. (Attachments: # <u>1</u> Exhibit(s) A) (Suder, Jonathan) (Entered: 05/06/2011)
05/06/2011	<u>174</u>	ELECTRONIC ORDER taking under advisement <u>173</u> Emergency Motion for Reconsideration and directing Defendant to respond to this motion no later than 5/11/2011.(Ordered by Judge Reed C O'Connor on 5/6/2011)(Judge Reed C O'Connor) (Entered: 05/06/2011)
05/09/2011	<u>175</u>	OBJECTION filed by Universal Lighting Technologies, Inc. re: <u>152</u> Response/Objection, <u>153</u> Designation of Deposition (Attachments: # <u>1</u> Exhibit(s) A) (Sterling, Deborah) (Entered: 05/09/2011)
05/09/2011	<u>176</u>	MOTION for Reconsideration re <u>172</u> Order on Motion for Summary Judgment, Order on Motion for Leave to File <i>or Clarification</i> filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 05/09/2011)
05/09/2011	<u>177</u>	Brief/Memorandum in Support filed by Universal Lighting Technologies, Inc. re <u>176</u> MOTION for Reconsideration re <u>172</u> Order on Motion for Summary Judgment, Order on Motion for Leave to File <i>or Clarification</i> (Sterling, Deborah) (Entered: 05/09/2011)
05/10/2011	<u>178</u>	Designation of Deposition by Lighting Ballast Control LLC. (Skeels, David) (Entered: 05/10/2011)
05/12/2011	<u>180</u>	NOTICE of Attorney Appearance by Glenn S Orman on behalf of Lighting Ballast Control LLC. (Orman, Glenn) (Entered: 05/12/2011)
05/17/2011	<u>183</u>	ORDER: Pretrial Conference set for 5/26/2011 09:30 AM in US Courthouse, Courtroom 1516, 1100 Commerce St., Dallas, TX 75242-1310 before Judge Reed C O'Connor. Counsel for Plaintiff Lighting Ballast Control, LLC and for Defendant Universal Lighting Technologies, Inc. are hereby ORDERED to appear and be prepared to discuss all issues related to the upcoming jury trial. (Ordered by Judge Reed C O'Connor on 5/17/2011) (apy) (Entered: 05/17/2011)
05/18/2011	<u>184</u>	RESPONSE filed by Lighting Ballast Control LLC re: <u>176</u> MOTION for Reconsideration re <u>172</u> Order on Motion for Summary Judgment, Order on Motion for Leave to File <i>or Clarification</i> (Suder, Jonathan) (Entered: 05/18/2011)
05/20/2011	<u>185</u>	REPLY filed by Universal Lighting Technologies, Inc. re: <u>176</u> MOTION for Reconsideration re <u>172</u> Order on Motion for Summary

		Judgment, Order on Motion for Leave to File <i>or Clarification</i> (Sterling, Deborah) (Entered: 05/20/2011)
05/23/2011	<u>186</u>	MOTION for Leave to File Sur-Reply to <i>LBCs Reply In Support of Its Emergency Motion for Reconsideration and Clarification</i> filed by Universal Lighting Technologies, Inc. with Brief/Memorandum in Support. (Attachments: # <u>1</u> Exhibit A) (Sterling, Deborah) (Entered: 05/23/2011)
05/25/2011	<u>187</u>	ORDER granting in part and denying in part <u>173</u> Plaintiff Lighting Ballast Control, LLC's Emergency Motion for Reconsideration and Clarification; denying <u>176</u> Defendant Universal Lighting Technologies, Inc.'s Motion for Reconsideration; and finding as moot <u>186</u> Plaintiff Lighting Ballast Control, LLC's Motion for Leave to File Sur-Reply. (Ordered by Judge Reed C O'Connor on 5/25/2011) (chmb)(kgc) (Entered: 05/25/2011)
05/27/2011	<u>188</u>	NOTICE of <i>Link to Patent Video</i> filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 05/27/2011)
06/01/2011	<u>191</u>	Joint STATUS REPORT <i>Regarding Product Groups 5 and 8</i> filed by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc.. (Suder, Jonathan) (Entered: 06/01/2011)
06/01/2011	<u>192</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Pretrial Conference Proceedings held on 05-26-11 before Judge Reed O'Connor. Court Reporter/Transcriber Denver B Roden, RPR, RMR, Telephone number 214-753-2298. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (39 pages) Redaction Request due 6/22/2011. Redacted Transcript Deadline set for 7/5/2011. Release of Transcript Restriction set for 8/30/2011. (dbr) (Entered: 06/01/2011)
06/02/2011	<u>193</u>	Witness List by Universal Lighting Technologies, Inc.. (Sterling, Deborah) (Entered: 06/02/2011)
06/03/2011	<u>194</u>	RESPONSE filed by Universal Lighting Technologies, Inc. re: 190 Emergency MOTION for Leave to File Amended Witness List MOTION to Amend/Correct <u>156</u> Witness List (Sterling, Deborah) (Entered: 06/03/2011)
06/03/2011	<u>195</u>	NOTICE re: 190 Emergency MOTION for Leave to File Amended Witness List MOTION to Amend/Correct <u>156</u> Witness List filed by

		Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 06/03/2011)
06/03/2011	<u>196</u>	***SEE <u>197</u> FOR CORRECT IMAGE***Joint STATUS REPORT <i>Regarding Products in the Case</i> filed by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc.. (Suder, Jonathan) Modified on 6/6/2011 (trt). (Entered: 06/03/2011)
06/03/2011	<u>197</u>	Joint STATUS REPORT <i>[amended] Regarding Products in the Case</i> filed by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc.. (Suder, Jonathan) (Entered: 06/03/2011)
06/06/2011	<u>198</u>	Exhibit List (<i>Plaintiff's Exhibit List</i>) by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 06/06/2011)
06/06/2011	<u>199</u>	Unopposed MOTION for Leave to Appear Without Local Counsel <i>as Defined Under L.R. 83.10(a)</i> filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 06/06/2011)
06/06/2011	<u>200</u>	Exhibit List (<i>Joint Exhibit List</i>) by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc.. (Suder, Jonathan) (Entered: 06/06/2011)
06/06/2011	<u>201</u>	Proposed Jury Instructions filed by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 06/06/2011)
06/06/2011	<u>202</u>	Exhibit List by Universal Lighting Technologies, Inc.. (Sterling, Deborah) (Entered: 06/06/2011)
06/06/2011	<u>203</u>	Proposed Jury Charge filed by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 06/07/2011)
06/07/2011	<u>204</u>	MOTION Request Ruling on Prior Art Exhibits filed by Universal Lighting Technologies, Inc. with Brief/Memorandum in Support. (Sterling, Deborah) (Entered: 06/07/2011)
06/07/2011	<u>205</u>	Appendix in Support filed by Universal Lighting Technologies, Inc. re <u>204</u> MOTION Request Ruling on Prior Art Exhibits (Attachments: # <u>1</u> Exhibit(s) A, # <u>2</u> Exhibit(s) A-1, # <u>3</u> Exhibit(s) A-2, # <u>4</u> Exhibit(s) A-3, # <u>5</u> Exhibit(s) A-4, # <u>6</u> Exhibit(s) A-5, # <u>7</u> Exhibit(s) A-6, # <u>8</u> Exhibit(s) B) (Sterling, Deborah) (Entered: 06/07/2011)
06/08/2011	<u>206</u>	Exhibit List (<i>Amended Joint Exhibit List</i>) by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc.. (Suder, Jonathan) (Entered: 06/08/2011)
06/08/2011	<u>207</u>	ORDER granting 190 Emergency Motion for Leave to Amend Witness List. It is therefore ORDERED that Plaintiff LBCs Emergency Motion for Leave to Amend Witness List is hereby GRANTED. (Ordered by Judge Reed C O'Connor on 6/8/2011) (trt) (Entered: 06/08/2011)
06/08/2011	<u>208</u>	Witness List by Lighting Ballast Control LLC. (Suder, Jonathan)

		(Entered: 06/08/2011)
06/08/2011	<u>209</u>	STIPULATION <i>[re product groups]</i> by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc.. (Attachments: # <u>1</u> Exhibit(s) A) (Suder, Jonathan) (Entered: 06/08/2011)
06/08/2011	<u>210</u>	RESPONSE filed by Lighting Ballast Control LLC re: <u>204</u> MOTION Request Ruling on Prior Art Exhibits (Suder, Jonathan) (Entered: 06/08/2011)
06/09/2011	<u>211</u>	NOTICE of U.S. Supreme Court Decision in <i>Microsoft Corp. v. i4i Limited Partnership</i> filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 06/09/2011)
06/09/2011	<u>212</u>	NOTICE <i>[amended]</i> Notice of U.S. Supreme Court Decision in <i>Microsoft Corp. v. i4i Limited Partnership</i> re: <u>211</u> Notice (Other) filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 06/09/2011)
06/09/2011	<u>213</u>	REPLY filed by Universal Lighting Technologies, Inc. re: <u>204</u> MOTION Request Ruling on Prior Art Exhibits (Sterling, Deborah) (Entered: 06/09/2011)
06/10/2011	<u>214</u>	ELECTRONIC ORDER granting <u>199</u> Motion for Leave to Appear Without Local Counsel. (Ordered by Judge Reed C O'Connor on 6/10/2011) (chmb)(kgc) (Entered: 06/10/2011)
06/10/2011	<u>215</u>	ORDER granting in part and denying in part <u>132</u> Motion to Strike ; granting in part and denying in part sealed and/or ex parte motion 158 . Accordingly, ULTs Motion to Strike Gallaghers expert report is GRANTED to the extent that Gallagher relies on the GE License and discusses ULTs incremental profit margin. As to the remainder of Gallaghers report, ULTs Motion to Strike is DENIED. ULTs Motion in Limine is GRANTED as indicated above with respect to Roman Numerals II, III, and IV and DENIED with respect to Roman Numeral I regarding the 529 patents presumed validity. (Ordered by Judge Reed C O'Connor on 6/10/2011) (trt) . (Entered: 06/10/2011)
06/10/2011	<u>216</u>	NOTICE <i>[Joint]</i> Regarding <i>Juror Notebooks</i> filed by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc. (Suder, Jonathan) (Entered: 06/10/2011)
06/10/2011	<u>217</u>	NOTICE <i>{Amended}</i> <i>[Joint]</i> Notice Regarding <i>Juror Notebooks</i> re: <u>216</u> Notice (Other) filed by Lighting Ballast Control LLC, Universal Lighting Technologies, Inc. (Attachments: # <u>1</u> Exhibit(s) A, # <u>2</u> Exhibit(s) B, # <u>3</u> Exhibit(s) C) (Suder, Jonathan) (Entered: 06/10/2011)
06/11/2011	<u>218</u>	ELECTRONIC ORDER: each side will have 30 minutes for opening statements.(Ordered by Judge Reed C O'Connor on 6/11/2011)(Judge

A151

		Reed C O'Connor) (Entered: 06/11/2011)
06/12/2011	<u>219</u>	Supplemental MOTION in Limine filed by Lighting Ballast Control LLC (Suder, Jonathan) (Entered: 06/12/2011)
06/12/2011	<u>220</u>	RESPONSE filed by Universal Lighting Technologies, Inc. re: <u>219</u> Supplemental MOTION in Limine (Sterling, Deborah) (Entered: 06/12/2011)
06/13/2011	<u>222</u>	REPLY filed by Lighting Ballast Control LLC re: <u>219</u> Supplemental MOTION in Limine (Attachments: # <u>1</u> Exhibit(s) Exhibit A) (Suder, Jonathan) (Entered: 06/13/2011)
06/13/2011	<u>223</u>	AMENDED DOCUMENT by Lighting Ballast Control LLC. Amendment to <u>222</u> Reply. to Defendant's Response Plaintiff's Motion in Limine. (Attachments: # <u>1</u> Exhibit(s) Exhibit A) (Suder, Jonathan) (Entered: 06/13/2011)
06/13/2011	<u>224</u>	Jury Roll. (trt) (Entered: 06/13/2011)
06/13/2011	<u>226</u>	ELECTRONIC Minute Entry for proceedings held before Judge Reed C O'Connor: Jury Trial begun on 6/13/2011. Trial continued to Tuesday, June 14, 2011 at 9:00am. (Court Reporter: Denver Roden) (Exhibits admitted) Time in Court - 10:00. (chmb) (Entered: 06/15/2011)
06/14/2011	<u>225</u>	Brief/Memorandum in Support filed by Universal Lighting Technologies, Inc. re <u>204</u> MOTION Request Ruling on Prior Art Exhibits (Sterling, Deborah) (Entered: 06/14/2011)
06/14/2011	<u>227</u>	ELECTRONIC Minute Entry for proceedings held before Judge Reed C O'Connor: Day #2 of Jury Trial held on 6/14/2011. Continued until 9:00am, June 15, 2011. (Court Reporter: Denver Roden) (Exhibits admitted) Time in Court - 9:27. (chmb) (Entered: 06/15/2011)
06/15/2011	<u>229</u>	ELECTRONIC Minute Entry for proceedings held before Judge Reed C O'Connor: Day #3 of Jury Trial held on 6/15/2011. Jury Trial continued until 9:00am 6/16/2011. (Court Reporter: Denver Roden) (Exhibits admitted) Time in Court - 9:39. (chmb) (Entered: 06/16/2011)
06/16/2011	<u>228</u>	TRIAL BRIEF <i>On Testimony of Tom Poehlman</i> by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 06/16/2011)
06/16/2011	<u>230</u>	Proposed Jury Charge filed by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 06/16/2011)
06/16/2011	<u>231</u>	Proposed Jury Charge filed by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 06/16/2011)
06/16/2011	<u>232</u>	TRIAL BRIEF <i>on Connected To Language</i> by Lighting Ballast Control LLC. (Suder, Jonathan) (Entered: 06/16/2011)

06/16/2011	<u>234</u>	Agreed Jury Charge. The parties submitted charge language. (apy) (Entered: 06/17/2011)
06/16/2011	<u>236</u>	ELECTRONIC Minute Entry for proceedings held before Judge Reed C O'Connor: Day #4 of Jury Trial held on 6/16/2011. Continued until 9:00am, June 17, 2011. (Court Reporter: Denver Roden) (Exhibits admitted) Time in Court - 9:03. (chmb) (Entered: 06/17/2011)
06/17/2011	<u>233</u>	AMENDED DOCUMENT by Lighting Ballast Control LLC. Amendment to <u>231</u> Proposed Jury Charge/Instructions.. (Suder, Jonathan) (Entered: 06/17/2011)
06/17/2011	<u>235</u>	ORDER: In consideration of the jurors circumstances, the Court ORDERS that meals be provided for the jury while they deliberate this case. See Order for further specifics. (Ordered by Judge Reed C O'Connor on 6/17/2011) (trt) (Entered: 06/17/2011)
06/17/2011	<u>237</u>	Jury Note Number 1. (trt) (Entered: 06/17/2011)
06/17/2011	<u>238</u>	Jury Note Number 2. (trt) (Entered: 06/17/2011)
06/17/2011	<u>239</u>	Proposed Jury Charge filed by Universal Lighting Technologies, Inc.. (Sterling, Deborah) (Entered: 06/17/2011)
06/17/2011	<u>240</u>	Jury Note Number 3. (trt) (Entered: 06/17/2011)
06/17/2011	<u>241</u>	JURY VERDICT. (trt) (Entered: 06/17/2011)
06/17/2011	<u>243</u>	ELECTRONIC Minute Entry for proceedings held before Judge Reed C O'Connor: Jury Trial completed on 6/17/2011. (Court Reporter: Denver Roden) (Exhibits admitted) Time in Court - 2:55. (chmb) (Entered: 06/21/2011)
06/18/2011	<u>242</u>	ORDER to file motion for judgment: see order for details.(Ordered by Judge Reed C O'Connor on 6/18/2011)(Judge Reed C O'Connor) (Entered: 06/18/2011)
06/27/2011	<u>244</u>	MOTION for Judgment filed by Lighting Ballast Control LLC with Brief/Memorandum in Support. (Suder, Jonathan) Modified on 6/27/2011 (apy). (Entered: 06/27/2011)
06/27/2011	<u>245</u>	Appendix in Support filed by Lighting Ballast Control LLC re <u>244</u> MOTION for Judgment (Suder, Jonathan) Modified on 6/27/2011 (apy). (Entered: 06/27/2011)
07/18/2011	<u>247</u>	RESPONSE filed by Lighting Ballast Control LLC re: 246 Sealed Motion for Judgment as a Matter of Law (Sealed pursuant to order dated 2/2/2010)Sealed Motion for Judgment as a Matter of Law (Sealed pursuant to order dated 2/2/2010) (Suder, Jonathan) (Entered: 07/18/2011)

07/18/2011	<u>248</u>	Appendix in Support filed by Lighting Ballast Control LLC re <u>247</u> Response/Objection (Suder, Jonathan) (Entered: 07/18/2011)
07/18/2011	<u>249</u>	(Document Restricted) Sealed Response re: <u>244</u> Motion for Judgment (Sealed pursuant to order dated 2/2/2010) filed by Universal Lighting Technologies, Inc. (Attachments: # <u>1</u> Appendix Part 1/3, # <u>2</u> Appendix Part 2/3, # <u>3</u> Appendix Part 3/3) (Sterling, Deborah) (Entered: 07/18/2011)
08/01/2011	<u>250</u>	REPLY filed by Lighting Ballast Control LLC re: <u>244</u> MOTION for Judgment (Suder, Jonathan) (Entered: 08/01/2011)
08/01/2011	<u>251</u>	Appendix in Support filed by Lighting Ballast Control LLC re <u>250</u> Reply in Support of its Motion for Judgment (Suder, Jonathan) (Entered: 08/01/2011)
08/01/2011	<u>252</u>	(Document Restricted) Sealed Reply re: 246 Sealed and/or Ex Parte Motion, (Sealed pursuant to order dated 2/2/2010) filed by Universal Lighting Technologies, Inc. (Attachments: # <u>1</u> Appendix) (Sterling, Deborah) (Entered: 08/01/2011)
08/10/2011	<u>253</u>	(Document Restricted) Sealed Response and Objection re: <u>250</u> Reply (Sealed pursuant to order dated 2/2/2010) filed by Universal Lighting Technologies, Inc. (Attachments: # <u>1</u> Appendix Part 1, # <u>2</u> Appendix Part 2, # <u>3</u> Appendix Part 3) (Sterling, Deborah) (Entered: 08/10/2011)
08/12/2011	<u>254</u>	RESPONSE filed by Lighting Ballast Control LLC re: <u>253</u> Sealed and/or Ex Parte Response/Objection, (Suder, Jonathan) (Entered: 08/12/2011)
08/26/2011	<u>255</u>	Memorandum Opinion and Order. Accordingly, ULTs Motion for Judgment as a Matter of Law should be and is hereby DENIED, and LBCs Motion for Entry of Judgment is GRANTED in part and DENIED in part. It is therefore ORDERED that the damages verdict of \$3,000,000.00 stands and represents a lump-sum royalty payment. It is further ORDERED that the Court awards prejudgment interest from the date of first infringement at the Texas statutory rate of 5%, compounded annually, amounting to \$1,543,479.20, bringing the total award to \$4,543,479.20, and post-judgment interest from the date of judgment at the rate set by 28 U.S.C. § 1961. (Ordered by Judge Reed C O'Connor on 8/26/2011) (trt) (Entered: 08/26/2011)
08/26/2011	<u>256</u>	JUDGMENT Pursuant to LR 79.2 and LCrR 55.2, exhibits may be claimed during the 60-day period following final disposition (to do so, follow the procedures found at www.txnd.uscourts.gov/Court_Records). The clerk will discard exhibits that remain unclaimed after the 60-day period without additional notice. (Clerk to notice any party not electronically noticed.) (Ordered by Judge Reed C O'Connor on 8/26/2011) (trt) (Entered: 08/26/2011)

09/07/2011	<u>257</u>	BILL OF COSTS by Lighting Ballast Control LLC. (Attachments: # <u>1</u> Exhibit(s) A, # <u>2</u> Exhibit(s) B, # <u>3</u> Exhibit(s) C, # <u>4</u> Exhibit(s) D, # <u>5</u> Exhibit(s) E, # <u>6</u> Exhibit(s) F) (Skeels, David) (Entered: 09/07/2011)
09/12/2011	<u>258</u>	NOTICE OF APPEAL to the Federal Circuit as to <u>172</u> Order on Motion for Summary Judgment, Order on Motion for Leave to File, <u>107</u> Memorandum Opinion and Order, <u>187</u> Order on Motion for Reconsideration,, Order on Motion for Leave to File,,, <u>255</u> Memorandum Opinion and Order,, <u>256</u> Judgment,, by Universal Lighting Technologies, Inc.. Filing fee \$455, receipt number 0539-4114321. T.O. form to appellant electronically at <u>Transcript Order Form</u> or US Mail as appropriate. Copy of NOA to be sent US Mail to parties not electronically noticed. (Sterling, Deborah) (Entered: 09/12/2011)
09/21/2011	<u>259</u>	Costs Taxed in amount of \$ 79,399.26 against Defendant (trt) (Entered: 09/21/2011)
09/21/2011	<u>260</u>	MOTION Review and Objections to Bill of Costs filed by Universal Lighting Technologies, Inc. (Sterling, Deborah) (Entered: 09/21/2011)
09/21/2011	<u>261</u>	Brief/Memorandum in Support filed by Universal Lighting Technologies, Inc. re <u>260</u> MOTION Review and Objections to Bill of Costs (Attachments: # <u>1</u> Declaration(s), # <u>2</u> Exhibit(s)) (Sterling, Deborah) (Entered: 09/21/2011)
09/26/2011	<u>262</u>	NOTICE OF APPEAL to the Federal Circuit by Lighting Ballast Control LLC. Filing fee \$455, receipt number 0539-4142061. T.O. form to appellant electronically at <u>Transcript Order Form</u> or US Mail as appropriate. Copy of NOA to be sent US Mail to parties not electronically noticed. (Suder, Jonathan) (Entered: 09/26/2011)
09/30/2011	<u>263</u>	RESPONSE filed by Lighting Ballast Control LLC re: <u>260</u> MOTION Review and Objections to Bill of Costs (Skeels, David) (Entered: 09/30/2011)
09/30/2011	<u>264</u>	Appendix in Support filed by Lighting Ballast Control LLC re <u>263</u> Response/Objection to <i>Defendant's Motion to Review and Objections to Plaintiff's Bill of Costs</i> (Attachments: # <u>1</u> Additional Page(s)) (Skeels, David) (Entered: 09/30/2011)
10/05/2011	<u>265</u>	Transmitted <u>262</u> Notice of Appeal, <u>258</u> Notice of Appeal, certified copies of current docket entries and orders appealed to the United States Federal Circuit Court of Appeals via Fedex 797592146950. (trt) (Entered: 10/05/2011)
10/13/2011	<u>266</u>	REPLY filed by Universal Lighting Technologies, Inc. re: <u>260</u> MOTION Review and Objections to Bill of Costs (Sterling, Deborah) (Entered: 10/13/2011)

10/13/2011	<u>267</u>	Appendix in Support filed by Universal Lighting Technologies, Inc. re <u>266</u> Reply in Support of its Objections to Plaintiff's Bill of Costs (Sterling, Deborah) (Entered: 10/13/2011)
10/17/2011	<u>268</u>	Received NOTICE OF DOCKETING from the United States Court of Appeals for the Federal Circuit re: <u>262</u> Notice of Appeal, <u>258</u> Notice of Appeal (trt). (Entered: 10/17/2011)
10/17/2011	<u>269</u>	Received NOTICE OF DOCKETING from the United States Court of Appeals for the Federal Circuit re: <u>262</u> Notice of Appeal, <u>258</u> Notice of Appeal (trt) (Entered: 10/17/2011)
10/17/2011	<u>270</u>	Transcript Order Form: re <u>262</u> Notice of Appeal, transcript requested by Universal Lighting Technologies, Inc. for Jury Selection Jury Trial Voir Dire held on 6/13/11 - 6/17/11 before Judge O'Connor. (Sterling, Deborah) (Entered: 10/17/2011)
11/15/2011	<u>271</u>	ORDER granting in part and denying in part <u>260</u> Motion to Review and Objections to Plaintiffs Bill of Costs: Based on the foregoing, the Court grants in part and denies in part Defendant Universal Lighting Technologies, Inc.s Motion to Review and Objections to Plaintiffs Bill of Costs [doc. 260]. The Court sustains ULTs objections to LBCs inclusion in the Bill of Costs of: \$2,790.54 in witness fees associated with Mr. Hayness deposition; and \$8,674.66 for compensation of interpreters and costs of special interpretation services under 28 U.S.C. § 1828. The parties have agreed that LBC is entitled to \$350.00 for fees of the clerk and \$106.88 for fees for service of summons and subpoenas. The Court determines that LBC is entitled to: \$12,706.50 for fees for printed or electronically recorded transcripts necessarily obtained for use in this case; \$6,166.95 for fees for witnesses; and \$14,503.73 for fees for exemplification and the costs of making copies of any materials where the copies are necessarily obtained for use in the case. In accordance with the foregoing, the Clerk shall tax costs against Defendant ULT in the amount of \$33,834.06. (Ordered by Judge Reed C O'Connor on 11/15/2011) (trt) (Entered: 11/15/2011)
11/15/2011	<u>272</u>	Costs Taxed in amount of \$ 33,834.06 against Defendant ULT per <u>271</u> Order. (trt) (Entered: 11/15/2011)
11/16/2011	<u>273</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Jury Trial Volume A Proceedings held on 06-14-11 before Judge Reed O'Conno. Court Reporter/Transcriber Denver B Roden, RPR, RMR, Telephone number 214-753-2298. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this

		transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (80 pages) Redaction Request due 12/7/2011. Redacted Transcript Deadline set for 12/19/2011. Release of Transcript Restriction set for 2/14/2012. (dbr) (Entered: 11/16/2011)
11/16/2011	<u>274</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Jury Trial Volume C Proceedings held on 06-14-11 before Judge Reed O'Connor. Court Reporter/Transcriber Denver B Roden, RPR, RMR, Telephone number 214-753-2298. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (124 pages) Redaction Request due 12/7/2011. Redacted Transcript Deadline set for 12/19/2011. Release of Transcript Restriction set for 2/14/2012. (dbr) (Entered: 11/16/2011)
11/16/2011	<u>275</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Jury Trial Volume A Proceedings held on 06-15-11 before Judge Reed O'Connor. Court Reporter/Transcriber Denver B Roden, RPR, RMR, Telephone number 214-753-2298. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (113 pages) Redaction Request due 12/7/2011. Redacted Transcript Deadline set for 12/19/2011. Release of Transcript Restriction set for 2/14/2012. (dbr) (Entered: 11/16/2011)
11/16/2011	<u>276</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Jury Trial Volume C Proceedings held on 06-15-11 before Judge Reed O'Connor. Court Reporter/Transcriber Denver B. Roden, RPR, RMR, Telephone number 214-753-2298. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed.

A157

		(104 pages) Redaction Request due 12/7/2011. Redacted Transcript Deadline set for 12/19/2011. Release of Transcript Restriction set for 2/14/2012. (dbr) (Entered: 11/16/2011)
11/16/2011	<u>277</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Jury Trial Volume A Proceedings held on 06-16-11 before Judge Reed O'Connor. Court Reporter/Transcriber Denver B Roden, RPR, RMR, Telephone number 214-753-2298. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (109 pages) Redaction Request due 12/7/2011. Redacted Transcript Deadline set for 12/19/2011. Release of Transcript Restriction set for 2/14/2012. (dbr) (Entered: 11/16/2011)
11/16/2011	<u>278</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Jury Trial Volume C Proceedings held on 06-16-11 before Judge Reed O'Connor. Court Reporter/Transcriber Denver B Roden, RPR, RMR, Telephone number 214-753-2298. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (70 pages) Redaction Request due 12/7/2011. Redacted Transcript Deadline set for 12/19/2011. Release of Transcript Restriction set for 2/14/2012. (dbr) (Entered: 11/16/2011)
11/16/2011	<u>279</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Jury Trial Volume E Proceedings held on 06-16-11 before Judge Reed O'Connor. Court Reporter/Transcriber Denver B Roden, RPR, RMR, Telephone number 214-753-2298. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (42 pages) Redaction Request due 12/7/2011. Redacted Transcript Deadline set for 12/19/2011. Release of Transcript Restriction set for

		2/14/2012. (dbr) (Entered: 11/16/2011)
11/16/2011	<u>280</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Jury Trial Volume B Proceedings held on 06-17-11 before Judge Reed O'Connor. Court Reporter/Transcriber Denver B Roden, RPR, RMR, Telephone number 214-753-2298. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (13 pages) Redaction Request due 12/7/2011. Redacted Transcript Deadline set for 12/19/2011. Release of Transcript Restriction set for 2/14/2012. (dbr) (Entered: 11/16/2011)
11/16/2011	<u>281</u>	(Document Restricted) NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Voir Dire Proceedings held on 6/13/2011 before Judge Reed O'Connor. Court Reporter/Transcriber Denver B Roden, RPR, RMR, Telephone number 214-753-2298. (trt) (Entered: 11/16/2011)
11/16/2011	<u>282</u>	ELECTRONIC (Document Restricted) Sealed Order -The Court orders that the voir dire transcript [Doc. 281] be SEALED. (Ordered by Judge Reed C O'Connor on 11/16/2011) (chmb) (Entered: 11/22/2011)
12/02/2011	<u>283</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Volume A Trial Proceedings held on 06/13/2011 before Judge Reed O'Connor. Court Reporter/Transcriber Shawn McRoberts, Telephone number (214) 753-2349. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (82 pages) Redaction Request due 12/23/2011. Redacted Transcript Deadline set for 1/3/2012. Release of Transcript Restriction set for 3/1/2012. (smm) (Entered: 12/02/2011)
12/02/2011	<u>284</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Volume B Trial Proceedings held on 06/13/2011 before Judge Reed O'Connor. Court Reporter/Transcriber Shawn McRoberts, Telephone number (214) 753-2349. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed

A158a

		at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (96 pages) Redaction Request due 12/23/2011. Redacted Transcript Deadline set for 1/3/2012. Release of Transcript Restriction set for 3/1/2012. (smm) (Entered: 12/02/2011)
12/02/2011	<u>285</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Volume B Trial Proceedings held on 06/14/2011 before Judge Reed O'Connor. Court Reporter/Transcriber Shawn McRoberts, Telephone number (214) 753-2349. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (87 pages) Redaction Request due 12/23/2011. Redacted Transcript Deadline set for 1/3/2012. Release of Transcript Restriction set for 3/1/2012. (smm) (Entered: 12/02/2011)
12/02/2011	<u>286</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Volume D Trial Proceedings held on 06/14/2011 before Judge Reed O'Connor. Court Reporter/Transcriber Shawn McRoberts, Telephone number (214) 753-2349. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (141 pages) Redaction Request due 12/23/2011. Redacted Transcript Deadline set for 1/3/2012. Release of Transcript Restriction set for 3/1/2012. (smm) (Entered: 12/02/2011)
12/02/2011	<u>287</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Volume B Trial Proceedings held on 06/15/2011 before Judge Reed O'Connor. Court Reporter/Transcriber Shawn McRoberts, Telephone number (214) 753-2349. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such

		Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (63 pages) Redaction Request due 12/23/2011. Redacted Transcript Deadline set for 1/3/2012. Release of Transcript Restriction set for 3/1/2012. (smm) (Entered: 12/02/2011)
12/02/2011	<u>288</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Volume D Trial Proceedings held on 06/15/2011 before Judge Reed O'Connor. Court Reporter/Transcriber Shawn McRoberts, Telephone number (214) 753-2349. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (152 pages) Redaction Request due 12/23/2011. Redacted Transcript Deadline set for 1/3/2012. Release of Transcript Restriction set for 3/1/2012. (smm) (Entered: 12/02/2011)
12/02/2011	<u>289</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Volume B Trial Proceedings held on 06/16/2011 before Judge Reed O'Connor. Court Reporter/Transcriber Shawn McRoberts, Telephone number (214) 753-2349. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (56 pages) Redaction Request due 12/23/2011. Redacted Transcript Deadline set for 1/3/2012. Release of Transcript Restriction set for 3/1/2012. (smm) (Entered: 12/02/2011)
12/02/2011	<u>290</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Volume D Trial Proceedings held on 06/16/2011 before Judge Reed O'Connor. Court Reporter/Transcriber Shawn McRoberts, Telephone number (214) 753-2349. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this

		transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (135 pages) Redaction Request due 12/23/2011. Redacted Transcript Deadline set for 1/3/2012. Release of Transcript Restriction set for 3/1/2012. (smm) (Entered: 12/02/2011)
12/02/2011	<u>291</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Volume A Trial Proceedings held on 06/17/2011 before Judge Reed O'Connor. Court Reporter/Transcriber Shawn McRoberts, Telephone number (214) 753-2349. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (68 pages) Redaction Request due 12/23/2011. Redacted Transcript Deadline set for 1/3/2012. Release of Transcript Restriction set for 3/1/2012. (smm) (Entered: 12/02/2011)
12/04/2011	<u>292</u>	NOTICE OF FILING OF OFFICIAL ELECTRONIC TRANSCRIPT of Jury Trial Volume B (FIRST) Proceedings held on 06-13-11 before Judge Reed O'Connor. Court Reporter/Transcriber Denver B Roden, RPR, RMR, Telephone number 214-753-2298. Parties are notified of their <u>duty to review</u> the transcript. A copy may be purchased from the court reporter or viewed at the clerk's office public terminal. If redaction is necessary, a <u>Redaction Request - Transcript</u> must be filed within 21 days. If no such Request is filed, the transcript will be made available via PACER without redaction after 90 calendar days. If redaction request filed, this transcript will not be accessible via PACER; see redacted transcript. The clerk will mail a copy of this notice to parties not electronically noticed. (100 pages) Redaction Request due 12/27/2011. Redacted Transcript Deadline set for 1/4/2012. Release of Transcript Restriction set for 3/5/2012. (dbr) (Entered: 12/04/2011)
02/13/2012	<u>293</u>	MOTION for Leave to File Motion to Redact Trial Transcripts filed by Universal Lighting Technologies, Inc. (Attachments: # <u>1</u> Exhibit(s) A, # <u>2</u> Proposed Order Exhibit B) (Sterling, Deborah) (Entered: 02/13/2012)
02/14/2012	<u>294</u>	***PROPOSED ORDER***ADDITIONAL ATTACHMENTS to <u>293</u> MOTION for Leave to File Motion to Redact Trial Transcripts by Defendant Universal Lighting Technologies, Inc.. (Sterling, Deborah) Modified on 2/14/2012 (trt). (Entered: 02/14/2012)
02/14/2012	<u>295</u>	ORDER granting <u>293</u> MOTION for Leave to File Motion to Redact Trial Transcripts filed by Universal Lighting Technologies, Inc.

A158d

		Accordingly, it is ORDERED that Defendant ULT file its Motion to Redact Trial Transcripts on or before February 15, 2012 at 12:00 PM, and that Plaintiff file its Response to the Motion to Redact on or before Thursday, February 16, 2012 at 5:00 PM.(Motion due by 2/15/2012, Response due by 2/16/2012) (Ordered by Judge Reed C O'Connor on 2/14/2012) (trt) (Entered: 02/14/2012)
02/15/2012	<u>296</u>	MOTION to Redact <u>276</u> , <u>286</u> Transcript filed by Universal Lighting Technologies, Inc. with Brief/Memorandum in Support. (Sterling, Deborah) (Entered: 02/15/2012)
02/15/2012	<u>297</u>	MOTION Temporarily Remove Transcripts from Public Access re <u>296</u> MOTION to Redact <u>276</u> , <u>286</u> Transcript filed by Universal Lighting Technologies, Inc. with Brief/Memorandum in Support. (Sterling, Deborah) (Entered: 02/15/2012)
02/16/2012	<u>299</u>	ORDER REDACTING TRIAL TRANSCRIPTS: granting <u>296</u> MOTION to Redact <u>276</u> , <u>286</u> Transcript filed by Universal Lighting Technologies, Inc. It is hereby ORDERED that the portions of testimony discussing terms of ULT's license agreements with nonparties as identified in ULT's Motion to Redact Trial Transcripts shall be redacted. (Ordered by Judge Reed C O'Connor on 2/16/2012) (apy) (Entered: 02/16/2012)
02/16/2012	<u>300</u>	Unopposed MOTION to Redact Doc. Nos. 298 and 298-1 filed by Universal Lighting Technologies, Inc. with Brief/Memorandum in Support. (Attachments: # <u>1</u> Exhibit(s) 1, # <u>2</u> Exhibit(s) 2) (Sterling, Deborah) (Entered: 02/16/2012)
02/22/2012	<u>301</u>	Redacted Transcript for remote electronic access re: <u>286</u> Transcript (smm) (Entered: 02/22/2012)
03/22/2012	<u>302</u>	ORDER of United States Court of Appeals for the Federal Circuit as to <u>262</u> Notice of Appeal, filed by Lighting Ballast Control LLC, <u>258</u> Notice of Appeal, filed by Universal Lighting Technologies, Inc. IT IS ORDERED THAT: The motion to dismiss 2012-1015 is granted. Appeal No 2012-1015 is dismissed. The revised official caption in 2012-1014 is reflected above. Each side shall bear its own costs in 2012-1015. The motion concerning the due date for Lighting's brief is granted. The brief if due 3/16/12. Issued As A Mandate (As To 2012-1015 Only): 3/16/2012. (trt) (Entered: 03/22/2012)
04/05/2012	<u>303</u>	ORDER: Having reviewed the motion, the Court finds it is well-taken and should be and is hereby GRANTED. Accordingly, it is ORDERED that the specific terms of ULT's license agreement with a third-party be redacted. Accordingly, the clerk is hereby directed to substitute the redacted versions of LBC's Response and Exhibit A in place of the versions LBC filed. (Ordered by Judge Reed C O'Connor on 4/5/2012)

A158e

District Version 4.2

Page 39 of 39

(apy) (Entered: 04/05/2012)

PACER Service Center			
Transaction Receipt			
04/12/2012 09:30:16			
PACER Login:	oh0264	Client Code:	23074-2001
Description:	Docket Report	Search Criteria:	7:09-cv-00029-O
Billable Pages:	26	Cost:	2.60

A158f

CLERK US DISTRICT COURT
NORTHERN DIST. OF TX
FILED

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION

2011 JUN 17 PM 8:14

LIGHTING BALLAST CONTROL LLC,

Plaintiff,

v.

UNIVERSAL LIGHTING TECHNOLOGIES,
INC.,

Defendant.

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DEPUTY CLERK 

CIVIL ACTION NO. 7:09-CV-00029-O

JURY TRIAL DEMANDED

CHARGE OF THE COURT

LADIES AND GENTLEMEN OF THE JURY:

You have heard the evidence presented by the parties and the arguments of their respective attorneys. It is now my duty to give you the charge in this case. It will be an oral charge and is given in an effort to assist you in your deliberation in deciding the issues you must decide to reach a fair and impartial verdict in this case. Perhaps this function of the Court is the most important one that the Court performs in the trial, so I ask you to pay close attention to my remarks.

You will remember that, at the beginning of this trial, I gave you some general instructions and definitions. Rather than repeat them, I ask you to recall them now in deciding the facts and issues that you are to decide. As I instructed you at the beginning of trial, you are the exclusive judges of the facts, the credibility of the evidence, and the weight to be given the testimony of the witnesses.

You are to perform your duty without bias or prejudice to any party. The law does not permit jurors to be governed by sympathy or prejudice. Corporations and all other persons are equal before the law and must be treated as equals in a court of justice. The Court and the parties expect that you will carefully and impartially consider all of the evidence, follow the law as I will

give it to you, and reach a just verdict. You are instructed that all persons, including the Plaintiff and the Defendant in this case, stand equal before the law, and are to be dealt with as equals in this Court.

I will now briefly review the contentions of the parties and give you some additional instructions and definitions that will guide you in deciding the issues or facts that you must resolve in this case.

PLAINTIFF'S CLAIMS AND DEFENDANT'S DEFENSES

The patent claims in issue are Claims 1, 2 and 5 of U.S. Patent 5,436,529, which has been referred to as "the '529 Patent." As a group, I will refer to these claims of the '529 Patent as "the asserted claims."

The Plaintiff, LBC, contends that the Defendant, ULT, has infringed claims 1, 2, and 5 of the '529 Patent by manufacturing and selling electronic lighting ballasts that include all of the requirements of those claims. Plaintiff contends it is entitled to damages to compensate for Defendant's alleged infringement, in the form of a reasonable royalty. Plaintiff also contends that ULT has willfully infringed the asserted claims.

ULT denies Plaintiff's claims and has asserted its own counterclaims on non-infringement and invalidity of the '529 patent. ULT contends that its electronic lighting ballasts do not infringe the asserted claims of the '529 Patent. ULT also contends the asserted claims are invalid. As a result, ULT contends that Plaintiff is not entitled to any damages. ULT also denies that it has willfully infringed any of the asserted claims.

Your job is to decide whether Defendant has infringed any of the asserted claims and whether each of the asserted claims are valid. If you decide that any claim of the '529 patent has been infringed and is valid, you will then need to decide any money damages to be awarded to

Plaintiff to compensate it for the infringement. You will also need to make a finding as to whether the infringement was willful. If you decide that any infringement was willful, that decision should not affect any damages award you make. I will take any finding of willful infringement into account later.

BURDENS OF PROOF

The Plaintiff bears the burden of proof by a preponderance of the evidence that the Defendant infringed the asserted claims of the '529 Patent. In other words, LBC must show that ULT's infringement is more probable than not.

The Plaintiff also has the burden of proof by a preponderance of the evidence for the amount of damages caused by Defendant's infringement. To establish willful infringement, Plaintiff bears the burden of proof by clear and convincing evidence that the Defendant's infringement was willful.

The Defendant bears the burden of proof by clear and convincing evidence that the asserted claims of the '529 patent are invalid.

To review, "preponderance of the evidence" means that you must be persuaded by the evidence that the claim is more probably true than not true. Clear and convincing evidence is a higher standard than proof by preponderance of the evidence. Clear and convincing evidence means the party must persuade you that it is highly probable that the facts are as the party contends. Nevertheless, the clear and convincing standard is not as high as the burden of proof applied in a criminal case, which is "beyond a reasonable" doubt.

I will now give you instructions and definitions to help you in answering the questions to follow.

CLAIM INTERPRETATION

Before you can decide many of the issues in this case, you will need to understand the role of patent “claims.” The patent claims are the numbered sentences at the end of each patent. The claims are important because the words of the claims, as interpreted by the Court, are what define the boundaries of the invention. The figures and text in the rest of the patent provide a description and at least one example of the invention (sometimes referred to as a “preferred embodiment”), and they provide a context for the claims. Claim terms are to be read and understood in the context of the particular claims in which they appear and in the context of the entire patent, including the specification. But it is the claims themselves, as interpreted by the Court, that define how broad or narrow the patent’s coverage is. Therefore, what a patent covers depends, in turn, on what each of its claims cover.

HOW A CLAIM DEFINES WHAT IT COVERS

I will now explain further how a claim defines what it covers.

A claim sets forth, in words, a set of requirements. Each claim sets forth its requirements in a single sentence. If a device satisfies each of these requirements, then it is covered by the claim.

There can be several claims in a patent. Each claim may be narrower or broader than another claim by setting forth more or fewer requirements. The coverage of a patent is assessed on a claim-by-claim basis. In patent law, the requirements of a claim are often referred to as “claim elements” or “claim limitations.” When a product meets all of the requirements of a claim, the claim is said to “cover” that product, and the product is said to “fall within the scope” of that claim. In other words, a claim covers a product where each of the claim elements or limitations is present in that product.

Sometimes the words in a patent claim are difficult to understand, and therefore it is difficult to understand what requirements these words impose. It is my job to explain to you the

meaning of the words in the claims and the requirements those words impose. You must apply the meaning I give the patent claims to both your decision on infringement and your decision on validity. I will now provide to you my definitions of certain claim terms and will instruct you on how those terms are to be understood when deciding the issues of infringement and validity in this case. You must accept my definitions of these words in the claims as being correct.

You have been provided with a copy of the '529 Patent and a copy of the claim term definitions, and you may use them in your deliberations. The asserted claims are as follows:

Claim 1.

[Preamble] An energy conversion device employing an oscillating resonant converter producing oscillations, having DC input terminals producing a control signal and adapted to power at least one gas discharge lamp having heatable filaments, the device comprising:

[A] voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals;

[B] output terminals connected to the filaments of the gas discharge lamp;

[C] control means capable of receiving control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and

[D] direct current blocking means coupled to the output terminals and operable to stop the flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective.

Claim 2. The device according to claim 1 wherein the resonant converter comprises a capacitor and an inductor connected in series via an intermediate node.

Claim 5. The device according to claim 1 wherein the direct current blocking means includes a capacitor and is connected effectively across at least one heatable filament of at least one gas discharge lamp.

“COMPRISING” CLAIMS

I will now explain how to consider a situation where an asserted claim uses the term “comprising.” In this instance, Claim 1 of the '529 patent uses the word “comprising.” When a claim uses the word comprising, it means including or containing. A claim that uses the word comprising or comprises is not limited to products having only the elements that are recited in the claim but also covers products that add additional elements.

This is relevant in this case because the preamble to Claim 1 uses the phrase “An energy conversion device employing an oscillating resonant converter producing oscillations, having DC input terminals producing a control signal and adapted to power at least one gas discharge lamp having heatable filaments, the device comprising:.”

If you find that Defendant’s products include all of the elements of Claim 1, the fact that Defendant’s products might include additional components would not avoid infringement of a claim that uses “comprising” language.

CLAIM CONSTRUCTION

I have construed or interpreted certain of the terms of the asserted claims to have the following meanings, which you should accept and apply in deciding this case:

As used in the Preamble of Claim 1, the phrase “oscillating resonant converter producing oscillations” is defined as “a circuit, or portion of a circuit, containing inductance, capacitance, and at least one electronic switching device (such as a transistor) that operates to convert direct current into alternating current.”

As used in the Preamble of Claim 1, the phrase “DC input terminals” is defined as “terminals for receiving a DC supply voltage.” The phrase “producing a control signal” is defined as “serving as the origin of direct current that travels along a direct current path from the DC input terminals, through the filament or filaments, and to an input terminal of the control means, but which does not pass through the DC blocking means.” This control signal from the DC input terminals is sometimes referred to as the “DC control signal.”

As used in Element A of Claim 1, the phrase “voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals” refers to “a rectifier.”

Some of the requirements of Claim 1 are written in a different format called “means-plus-function,” which I will now explain.

MEANS-PLUS-FUNCTION CLAIMS

Along with the terms I just described, there are certain claim requirements that are written in what is called “means-plus-function” format, including the “control means” requirement and the “direct current blocking means” requirement. The patent laws permit requirements of a claimed invention to be expressed simply as a “means” or “way” for performing a certain function, without reciting in the claim the physical structure that actually performs the claimed function. Such “means-plus-function” requirements do not cover all of the structures that could perform the function set forth in the claim. Instead, they cover only the structure disclosed in the patent’s specification to perform the claimed function and equivalents of that disclosed structure. The issue of whether two structures are identical or equivalent is for you to decide. I will explain to you later how to determine whether two structures are “equivalent” to one another. I have identified the structures described in the ’529 patent that perform the functions recited in the means-plus-function requirements. You should apply my definitions of the functions and the

structures described in the '529 patent for performing those functions, just as you must apply my definitions of any other claim terms.

There are two claim requirements in Claim 1 that use the means-plus-function format. The first requirement that is written in means-plus-function format is "control means capable of receiving control signals from the DC input terminals and from the resonant converter, and operable to effectively stop the oscillations of the converter."

This "control means" requirement recites four functions, as follows:

(1) control means

(a) capable of receiving a control signal from the DC input terminals and;

(b) operable to effectively initiate the oscillations, and;

(2) control means

(a) capable of receiving a control signal from the resonant converter, and;

(b) operable to effectively stop the oscillations.

The corresponding structure for the "control means" requirement is the control circuit (58) described at column 3, line 59 through column 4, line 21 of the '529 Patent.

The second requirement of Claim 1 that uses the means-plus-function format is the "direct current blocking means" requirement. The claimed function of the "direct current blocking means" is "operable to stop the flow of the control signal from the DC input terminals, whenever the DC control path through the filaments is broken due to lamp removal or a broken filament." The corresponding structure for the "direct current blocking means" requirement is as follows: "DC blocking capacitors (08 and 25) connected to the heatable filaments of the lamp."

All other words of the claims have their plain and ordinary meanings, as those words would be understood by a person of ordinary skill in the field, when read in the context of the patent

specification and claims. I will now instruct you on what is meant by a person of ordinary skill in the art.

LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art is a person with a specific level of education, training, and experience in the field such that they understand what is being taught by a patent based on such background. It is up to you to decide the level of ordinary skill in the field of the invention. You should consider all of the evidence introduced at trial in making this decision, including: the educational level and experience of people working in the field, the types of problems faced by workers in the field and the solutions found for those problems, and the sophistication of the technology in the field.

Plaintiff contends that, for this case, the hypothetical person of ordinary skill in the relevant field is a person who, as of February 1, 1993, would have had:

- (a) a bachelor's degree in electrical engineering degree, or equivalent, and five years of experience in electronic ballast design, or five years experience in power electronics with one year experience in ballast design; or
- (b) a Master's degree in electrical engineering or equivalent, and two years experience in electronic ballast design, or two years of experience in power electronics with one year experience in electronic ballast design.

A person of ordinary skill in the art would also understand the basic electrical characteristics of fluorescent lamps, the practical application of electronic ballasts in the marketplace, key regulatory requirements that impact the use of electronic ballasts, and at least some knowledge of the products available from various vendors.

Defendant contends that a person of ordinary skill in the relevant field for purposes of this

case is a hypothetical person who, as of February 1, 1993:

had a bachelor of science degree in electrical engineering, or an equivalent degree, and three to five years of experience in the field of lighting technology. This definition is flexible in that more advanced educational degrees could substitute for the specified industry experience and more extensive industry experience could substitute for the specified educational background.

Next, I will instruct you on how to determine whether the '529 Patent has been infringed by ULT.

DETERMINING INFRINGEMENT

Once a patent has issued, infringement can occur if a person or entity, without the owner's permission, makes, uses, offers to sell, or sells the patented invention anywhere in the United States during a period of 20 years measured from the filing date of the earliest underlying patent application. In this case, the 20-year exclusivity period of the '529 Patent ends in 2013.

Plaintiff has alleged that Defendant directly infringes the '529 Patent. To prove infringement of any claim, the Plaintiff has the burden to persuade you by a preponderance of the evidence that the Defendant has infringed that claim.

When comparing claims, the Plaintiff need not prove that the Defendant had the intent to infringe the patent or that it knew its acts infringed the patent. Good faith is not a defense to a claim of infringement.

Keep in mind that only the claims of a patent can be infringed. You must compare the asserted patent claims, as I have defined each of them, to the Defendant's products to determine whether or not there is infringement. When comparing the claims to Defendant's products, you must consider each claim and each product individually, and you must reach your decision

regarding infringement based on my instructions about the meaning and scope of the claims as they have been defined, the legal requirements for infringement, and the evidence presented to you by the parties. I will now describe for you the legal requirements for infringement.

INFRINGEMENT GENERALLY

I will first instruct you on what infringement means in a general sense. Then I will identify several key elements that make up infringement. In order to infringe a patent claim, a product must meet all the requirements of a claim. A claim limitation is present if it exists in the Defendant's product as I have explained the language to you or, if I did not explain it, as it would be understood by one of ordinary skill in the art, as understood in the context of the patent claims and specification.

You should consider each of the asserted claims of the '529 Patent separately. However, not all claims of a patent must be infringed for LBC to establish infringement. Plaintiff need only establish by a preponderance of the evidence that one claim is infringed.

INFRINGEMENT

A patent claim is infringed if the Defendant's product satisfies each and every requirement of that patent claim. If the Defendant's product does not satisfy one or more requirements of a claim, the Defendant does not infringe that claim.

The accused product should be compared to the invention described in each patent claim it is alleged to infringe. The same element of the accused products may satisfy more than one requirement of a claim.

As I have instructed you, the asserted claims include two requirements, or limitations, that use the means-plus-function format: the "control means" requirement and the "direct current

blocking means” requirement. To prove that an accused product satisfies a means-plus-function requirement, a patent owner must prove two things by a preponderance of the evidence.

First, an accused product needs to contain a structure that performs the same function as the function recited in the claim requirement. Second, the structure of the accused product that performs that function must be the same as or “equivalent” to the corresponding structure disclosed in the patent specification for performing that recited function. If you find the same or an equivalent structure in the accused product, the requirement is satisfied by that product for purposes of infringement.

The equivalent structure determination must be decided from the perspective of a person of ordinary skill in the art. A structure is “equivalent” if the hypothetical “ordinary skilled person” would consider the differences between the accused structure and the structure in the patent specification to be “insubstantial.”

One way to determine whether the differences between the two structures are “insubstantial” is to determine whether or not the accused structure performs the same function, in substantially the same way, to achieve substantially the same result as the structure disclosed in the patent specification. In deciding whether the differences would be “insubstantial,” you may also consider whether or not persons of ordinary skill in the field of the invention believed that the structure disclosed in the specification and the structure of the accused product were interchangeable at the time the ’529 Patent was issued, though interchangeability of one structure for another does not suffice to show that those structures are equivalent. The structure in the accused product must also have been available at the time the ’529 Patent issued.

INDEPENDENT AND DEPENDENT CLAIMS

My instructions so far have related to independent claims. Patent claims may exist in two forms, referred to as independent and dependent claims. An independent claim does not refer to any other claims of the patent. Thus, it is not necessary to look at any other claim to determine what an independent claim covers. Claim 1 of the '529 patent is an independent claim.

A dependent claim refers to at least one other claim in the patent. A dependent claim includes each of the requirements of the other claim to which it refers, as well as the additional requirements recited in the dependent claim itself. Therefore, to determine what a dependent claim covers, it is necessary to look at both the dependent claim and the other claim to which it refers.

Claims 2 and 5 are dependent claims. Both of these claims refer to Claim 1. To determine what a dependent claim covers, the words of that dependent claim and the claim to which it refers must be read together.

Because a dependent claim includes all the requirements of the independent claim to which it refers, if you find that claim 1 is not infringed, then you cannot find that claim 2 or claim 5 is infringed.

WILLFUL INFRINGEMENT

In this case, Plaintiff contends that Defendant infringed and, further, that Defendant infringed willfully. If you have decided that Defendant has infringed a claim or claims and the claims is/are valid, you must go on and address the additional issue of whether or not this infringement was willful. The mere fact that the Defendant infringed the patent is not enough to prove willfulness.

To prove willful infringement, the Plaintiff must prove by clear and convincing evidence that Defendant acted recklessly. To prove Defendant acted recklessly, the Plaintiff must satisfy a two-part test. The first part of this test is objective. I will explain this further in a moment. The second part is subjective, which means that you must attempt to ascertain the Defendant's state of mind.

First, Plaintiff must prove that the Defendant acted despite an objectively high likelihood that its actions constituted infringement of a valid patent. The Defendant's state of mind is not relevant for this part of the inquiry. Here, you should focus on whether a reasonable person in the position of the Defendant, after learning of the patent, could have reasonably believed that he or she did not infringe or that the patent was invalid. Legitimate or credible defenses to infringement, even if ultimately not successful, demonstrate a lack of recklessness. If you conclude that a reasonable person in the Defendant's position could not have held such a belief, then you must proceed to the second part of the test.

The second part of the test looks at the Defendant's state of mind. If you find that the Defendant proceeded in the face of an unjustifiably high risk, then you must determine whether that risk was known or obvious to the Defendant. The Plaintiff must prove that the Defendant actually knew, or it was so obvious that the Defendant should have known, that its actions constituted infringement of a valid patent. In deciding whether the Defendant's actions satisfied this second part of the test, you should consider all of the facts surrounding the alleged infringement.

In making the determination as to willfulness, consider all the facts surrounding the alleged infringement, including but not limited to the following:

(1) whether the Defendant acted in a manner consistent with the standards of commerce for its industry;

(2) whether or not there is a reasonable basis to believe that Defendant did not infringe or had a reasonable defense to infringement;

(3) whether or not Defendant made a good-faith effort to avoid infringing the '529 patent, for example, whether Defendant attempted to design around the '529 patent; and

(4) whether or not Defendant tried to cover up its infringement.

VALIDITY

Defendant contends that the asserted claims of Plaintiff's Patent are not valid. Patent invalidity is a defense to patent infringement. Even though the PTO examiner has allowed the claims of a patent, you have the ultimate responsibility for deciding whether the claims of the patent are valid.

I will now instruct you on the invalidity issues you should consider. As you consider these issues, remember that Defendant bears the burden of proving that it is highly probable that the claims are invalid.

Each claim of a patent issued by the United States Patent Office is entitled to a presumption of validity. In order to overcome the presumption of validity, Defendant must show it is highly probable the asserted claims of the patent are invalid. In deciding whether Defendant has met this "highly probable" burden, you may afford greater weight to "prior art" that was not considered by the Patent Office prior to issuing the patent.

PRIOR ART

What came before the invention is referred to as "prior art." The Defendant is relying on various items of prior art. In order to do so, the Defendant must prove that the items fall within one or more categories of prior art recognized by the patent laws. These categories include:

- (1) anything that was publicly known or used in the United States by someone other than the inventor before the inventor made the invention; and
- (2) anything that was patented or described in a printed publication anywhere in the world before the date of the invention, or more than one year before the effective filing date of the patent-in-suit.

In this case, the prior art is limited to the following: JP 61-153997 ("JP '997"), and JP 3-53799 ("JP '799"). You must decide whether any of these items, considered separately, serve to invalidate the asserted claims of the '529 Patent.

I'm now going to instruct you further on the invalidity defenses that you will have to evaluate in this case. You may consider the following invalidity defenses and no others.

ANTICIPATION

A person cannot obtain a patent if someone else already has made an identical invention. Simply put, the invention must be new. An invention that is not new or novel is said to be "anticipated by the prior art." Under the U.S. patent laws, an invention that is "anticipated" is not entitled to patent protection. To prove anticipation, the Defendant must prove by the clear and convincing evidence that the claimed invention is not new.

Anticipation must be determined on a claim-by-claim basis. In this case, the Defendant contends that all of the asserted claims of the '529 Patent are anticipated. To anticipate a claim, each and every requirement of the claim must be present in a single item of prior art. You may not combine two or more items of prior art to prove anticipation. In determining whether every one of

the requirements of the claimed invention is found in the prior art, you should take into account what a person of ordinary skill in the art would have understood from his or her examination of the particular publication. The prior art does not have to use the same words as the claim, but the requirements of the claim must have been disclosed, either stated expressly or implied to a person having ordinary skill in the art in the technology of the invention, so that looking at that one reference, that person could make and use the claimed invention.

DAMAGES

If you find the Defendant has infringed any of the asserted claims of the '529 Patent and that the claims are valid, then you should consider the amount of money Plaintiff should receive as damages. Plaintiff has the burden of proving the amount of damages caused by the Defendant's infringement by a preponderance of the evidence.

Even though I am instructing you on how you should measure damages, this should not be taken to mean that I believe the Defendant has infringed or that the patent is valid. These are issues for you to resolve under the instructions I have given you. I am instructing you on damages only so that you will have guidance should you decide that Plaintiff is entitled to recover damages.

If you find that there has been infringement, then Plaintiff is entitled to an award of damages adequate to compensate him for the infringement, but in no event less than a reasonable royalty for the use Defendant made of the invention. Here, the Plaintiff is asking for damages in the form of a reasonable royalty.

The amount of damages the Plaintiff can recover is limited to those acts of infringement by the Defendant that occurred within the six-year period preceding the date this lawsuit was filed, or that occurred since the date the Defendant had notice that it infringed the '529 Patent, whichever

period is shorter. Notice of infringement can be actual or constructive, and I will explain in a moment what that means.

Actual notice means that the patent holder communicated to the alleged infringer a specific charge of infringement of the '529 Patent. This notice is effective as of the date given.

Constructive notice means that the patent holder complied with the marking requirement of the patent laws. "Marking" means that substantially all of the products made, offered for sale, or sold under the '529 Patent are marked to display the word 'patent' or the abbreviation 'pat.', together with the number of the patent. The Plaintiff has the burden of establishing substantial compliance with the marking requirement. To do so, the Plaintiff must show it is more probable than not that substantially all of the products made, offered for sale, or sold under the '529 Patent were marked, and that the patent holder made reasonable efforts to ensure that its licensees who made, offered for sale, or sold products under the '529 Patent marked substantially all of their products.

Your job is to calculate damages from the date the Defendant received either actual or constructive notice, whichever was first. You should not award damages for any infringement by the Defendant occurring before it first received actual or constructive notice of the '529 Patent.

The Defendant contends that the marking requirement was not complied with, and so the Plaintiff cannot be awarded damages for any infringement before receipt of actual notice. LBC contends that the marking requirement was complied with prior to ULT receiving actual notice, and so it should be awarded damages from February 3, 2003, which is the date that is six years before this lawsuit was filed.

Generally, a reasonable royalty is defined in the patent law as the reasonable amount that someone wanting to use the patented invention should expect to pay to the patent owner and the

owner should expect to receive. A royalty is a payment made to a patent holder in exchange for rights to make, use or sell the claimed invention. A reasonable royalty is the payment that would have resulted from a negotiation between a patent holder and the infringer taking place just before the time when the infringing sales first began. In considering the nature of this negotiation, the focus is on what the expectations of the patent holder and infringer would have been had they entered into an agreement at that time and acted reasonably in their negotiations. In making your determination of the amount of a reasonable royalty, it is important that you focus on the time period when the infringer first allegedly infringed the patent and the facts that existed at the time.

Your determination does not depend on the actual willingness of the parties to this lawsuit to engage in such negotiations. Your focus should be on what the parties' expectations would have been had they entered negotiations for royalties at the time of the infringing activity. The infringer's actual profits may or may not bear on the reasonableness of an award based on a reasonable royalty. You are to assume that both parties to that hypothetical negotiation understood the patent to be valid and infringed and that the licensee would respect the patent. In addition, you must assume that the patent holder and infringer were willing to enter into an agreement; your role is to determine what that agreement would have been. The test for damages is what royalty would have resulted from the hypothetical negotiation and not simply what either party would have preferred.

In determining a reasonable royalty rate, you should consider all of the facts known and available to the parties at the time the infringement began. Some of the kinds of factors that you may consider in making your determinations are:

- (1) whether the patent holder had an established royalty for licensing the invention;

- (2) the nature of the commercial relationship between the patent owner and the licensee, such as whether they were competitors or whether their relationship was that of an inventor and promoter;
- (3) the established profitability of the patented product, its commercial success and its popularity at the time;
- (4) whether the patent owner had an established policy of granting licenses or retaining the patented invention as its exclusive right, or whether the patent holder had a policy of granting licenses under special conditions designed to preserve his monopoly;
- (5) the duration of the patent and of the license, as well as the terms and scope of the license, such as whether it is exclusive or nonexclusive or subject to territorial restrictions;
- (6) the rates paid by the licensee for the use of the other patents comparable to the Plaintiff's patent;
- (7) whether the licensee's sales of the patented invention promote sales of its other products and whether the invention generates sales to the inventor of his nonpatented items;
- (8) the utility and advantages of the patented property over the old modes or devices, if any, that had been used for working out similar results;
- (9) The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention;

- (10) the extent to which the infringer used the invention and any evidence probative of the value of such use;
- (11) the portion of the profits in the particular business that are customarily attributable to the use of the invention or analogous inventions;
- (12) the portion of the profits that should be credited to the invention as distinguished from nonpatented elements, the manufacturing process, business risks or significant features or improvements added by the infringer;
- (13) the opinion and testimony of qualified experts;
- (14) any other factors which in your mind would have increased or decreased the royalty the infringer would have been willing to pay and the patent owner would have been willing to accept, acting as normal, prudent business people.

You must not award Plaintiff more damages than are adequate to compensate for the infringement nor should you include any additional amount for the purpose of punishing the Defendant or setting an example. You may not include damages that are speculative, damages that are only possible, or damages that are based on guesswork.

FINAL INSTRUCTIONS

Nothing that I may have said or done during the course of this trial is intended to indicate any view of mine as to which party should, or should not, win this case. As I instructed you previously, the jury is the sole judge of the credibility of the testimony and the weight to be given the evidence.

These instructions are given to you as a whole, and you are not to single out one instruction alone as stating the law but must consider the instructions as a whole. You have heard all of the evidence in the case, and you have heard the arguments of counsel. The Court has given you the

charge in this case. In a few moments, you will retire to the jury room, select one of your members to act as a foreperson, and begin performing the function for which you have been chosen and for which you have been empanelled, in accordance with the oath you took as jurors. You will remember that at the beginning of the trial, the Court admonished you not to discuss the case with each other until it was submitted to you.

Now is the time for you to begin your discussion, and you certainly may express an opinion from the evidence that you have heard and use any reasonable means to persuade other members of the jury to your convictions and to your honest opinion. You are to reach a verdict which speaks the truth, and which does justice to all parties without favor, bias, or prejudice in any particular way, either for or against any party to this lawsuit. In the course of your deliberations, do not hesitate to reexamine your own views, and change your opinion if convinced it is erroneous. But, do not surrender your honest conviction as to the weight or effect of the evidence solely because of the opinion of your fellow jurors, or for the mere purpose of returning a verdict.

The verdict must represent the considered judgment of each juror. In order to return a verdict, it is necessary that each juror agree thereto. Your verdict must be unanimous. As soon as you have reached a verdict, you will let this fact be known to the officer who will be waiting upon you and he will report to the court.

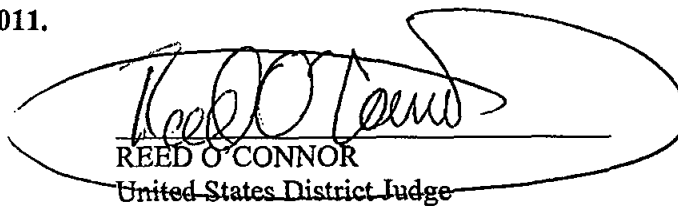
Your verdict will be in the form of Questions for you to answer. You will take these Questions to the jury room, and when you have reached a unanimous agreement as to your verdict, you will have your foreperson fill in, date, and sign the form and then advise the Court Security Officer that you have reached a verdict. During your deliberations, you may have any of the exhibits that have been offered into evidence, and the Court will send them to you upon written request. If you desire further instructions, your foreperson may make this known in writing, and

the Court will try to comply with your wishes. All communications with the Court must be in writing, but at no time should you indicate to the Court or to anyone else how the jury is divided in answering any particular Question.

You will now go to the jury room, select one of your members as foreperson, and begin your deliberations.

You may now retire to the jury room to conduct your deliberations.

SIGNED this 17th day of June, 2011.



REED O'CONNOR
United States District Judge

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION

LIGHTING BALLAST CONTROL LLC,

Plaintiff,

v.

UNIVERSAL LIGHTING TECHNOLOGIES, INC.,

Defendant.

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CIVIL ACTION NO. 7:09-CV-00029-O

JURY TRIAL DEMANDED

VERDICT FORM

Section No. I – Question Regarding Infringement

QUESTION NO. 1 – INFRINGEMENT OF THE '529 PATENT

Do you find by a preponderance of the evidence that the ULT products listed below have infringed Claims 1, 2, or 5 of the '529 Patent? Answer "YES" or "NO" as to each product and each claim.

Products	Claim 1	Claim 2	Claim 5
Linear Group 1 (B254PUNV-D (Gen D))	yes	yes	yes
Linear Group 2 (B224PUNV-C (Gen A))	yes	yes	yes
Linear Group 3 (B332PUNVHP-A (Gen A))	yes	yes	yes
Linear Group 4 (B228PUNV115-D, Gen C))	yes	yes	yes
CFL Group 1 (C2642UNVxxx (Gen E))	yes	yes	yes
CFL Group 2 (C213UNVxxx (Gen E))	yes	yes	yes
ES Group (Product TBD)	yes	yes	yes

Section No. II – Question Regarding Invalidity

If you have answered "NO" to all of Question 1 you do not need to consider the question below. If you have answered "YES" to any part of Question 1, then for each claim that you have entered such an answer, you must respond to the question below.

QUESTION NO. 2 – ANTICIPATION

Do you find by clear and convincing evidence that any of the following claims of the '529 Patent are invalid as anticipated? Answer "YES" or "NO" as to each reference and each claim:

Prior Art Reference	Claim 1	Claim 2	Claim 5
JP '997:	NO	NO	NO
JP '799:	NO	NO	NO

Section No. III – Questions Regarding Damages and Willfulness

QUESTION NO. 3 – DAMAGES

Please answer the following question only if you answered "YES" to any part of Question 1 and you answered "NO" for the same claim for Questions 2.

What sum of money, if any, do you find from a preponderance of the evidence is adequate to compensate Plaintiff for Defendant's conduct that you found to infringe? Provide the amount, if any, in dollars and cents.

\$ 3,000,000.00

QUESTION NO. 4 – WILLFUL INFRINGEMENT

Please answer the following question only if you answered "YES" to any part of Question 1 and you answered "NO" for the same claim for Questions 2.

For any of the following claims for which you answered "YES" to any product in Question 1, do you find by clear and convincing evidence that such infringement was willful?

Answer "YES" or "NO": NO

You are finished. The Jury Foreperson should sign on the space provided at the end of this charge and then alert the Court Security Officer that you have reached a verdict.

Certification of Jury Verdict

The foregoing is the unanimous verdict of the jury.

Dated: 6-17-2011


Jury Foreperson

Judy Freeman
Printed Name of Foreperson



US005436529A

United States Patent [19]**Bobel**[11] **Patent Number:** **5,436,529**[45] **Date of Patent:** **Jul. 25, 1995****[54] CONTROL AND PROTECTION CIRCUIT FOR ELECTRONIC BALLAST**[76] **Inventor:** Andrzej A. Bobel, 201 Norman Ct., Des Plaines, Ill. 60016[21] **Appl. No.:** 52,224[22] **Filed:** Apr. 22, 1993**Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 11,971, Feb. 1, 1993, abandoned.

[51] **Int. Cl.:** H05B 37/02[52] **U.S. Cl.:** 315/127; 315/122; 315/125; 315/119; 315/106; 315/107[58] **Field of Search:** 315/127, 119, 122, 125, 315/106, 107, 360**[56] References Cited****U.S. PATENT DOCUMENTS**

3,084,294 4/1964 Grunwaldt .
 4,461,980 7/1984 Nilssen .
 4,616,158 10/1986 Krummel et al. .
 4,710,682 3/1987 Zuchtriegel 315/224

5,004,955 4/1991 Nilssen 315/119
 5,179,509 1/1993 Ling 363/17

Primary Examiner—Benny Lee**Assistant Examiner**—Reginald A. Ratliff**Attorney, Agent, or Firm**—Hill, Steadman & Simpson**[57] ABSTRACT**

A series-resonant ballast for powering at least one gas discharge lamp (16) having heatable filaments (12,15) includes: DC voltage input terminals (B+,B-); an oscillating resonant converter (55,26,51,52,53) for producing high frequency voltage for application to the gas discharge lamp; a control circuit (58) able to receive a control signal from the DC input terminals and from the resonant converter and operable to initiate and stop the oscillations; and direct current blocking circuits (57,50) coupled across the filaments (12,15) and operable to stop flow of the control signal from the DC input terminals, thereby the ballast will not oscillate and will not draw any power from the DC input terminals, whenever the gas discharge lamp is: (i) removed from the output terminals, (ii) is defective, or (iv) is inoperative.

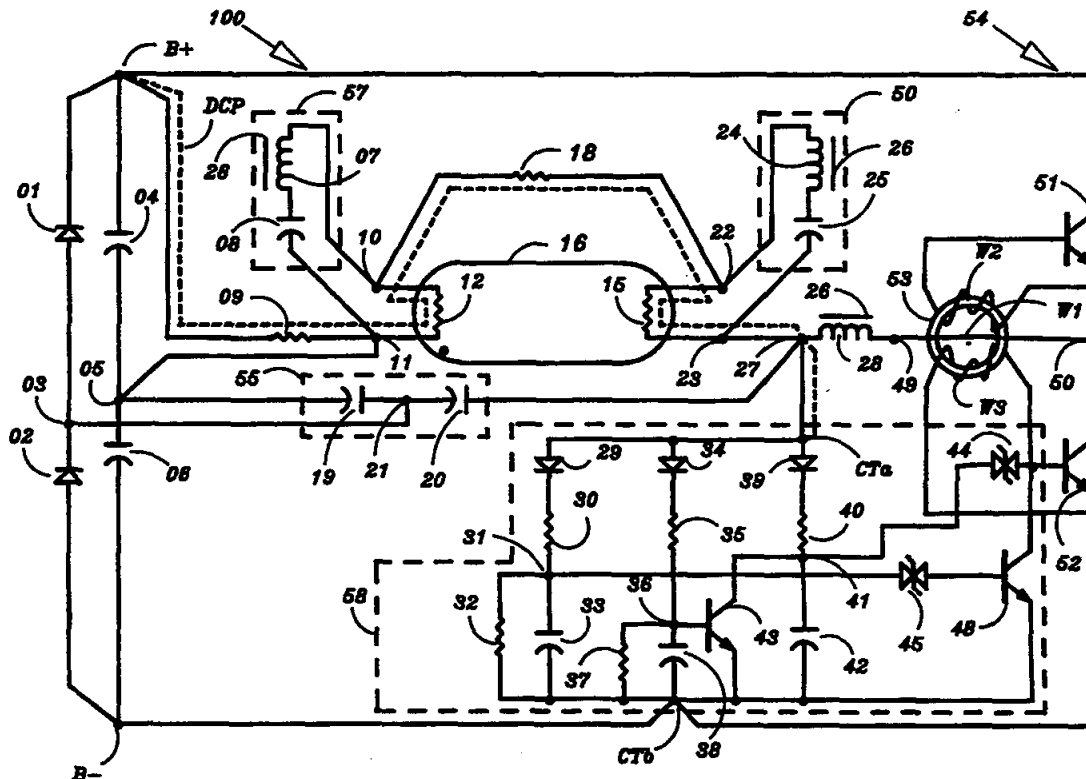
18 Claims, 7 Drawing Sheets

FIG. 2

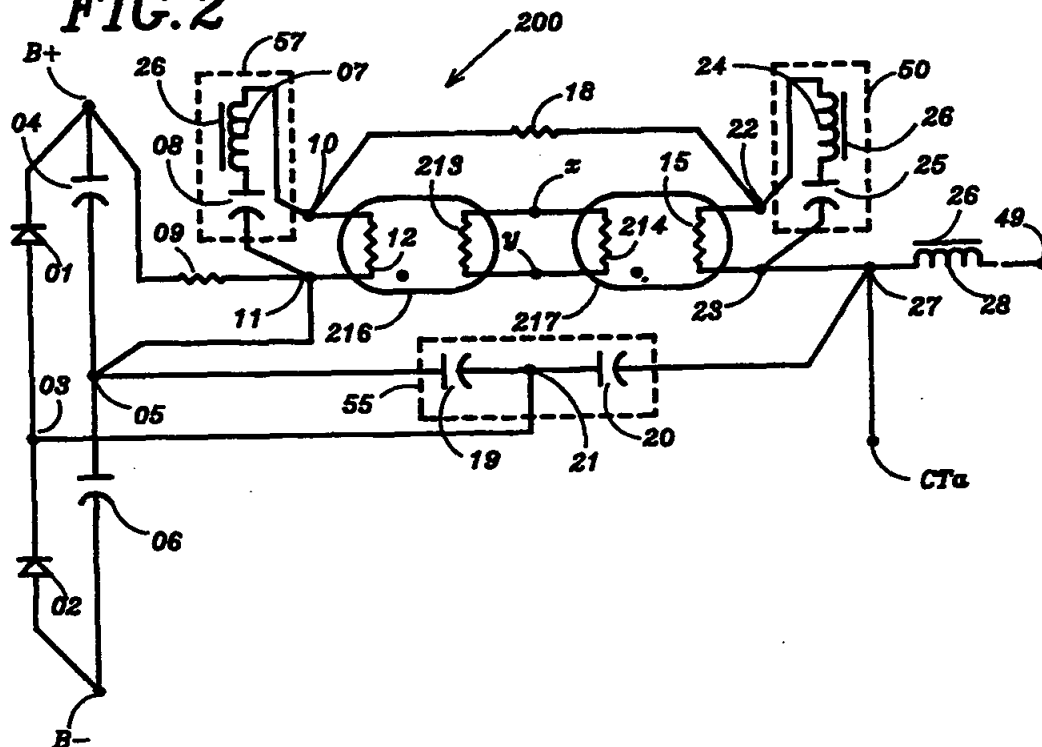
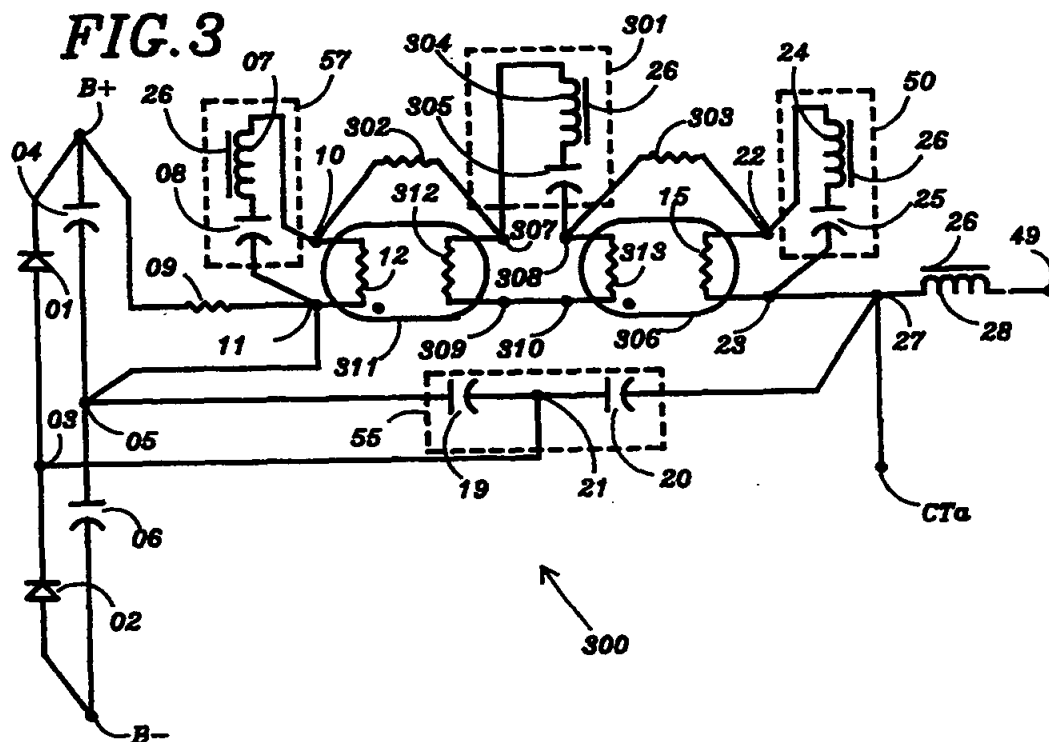


FIG. 3



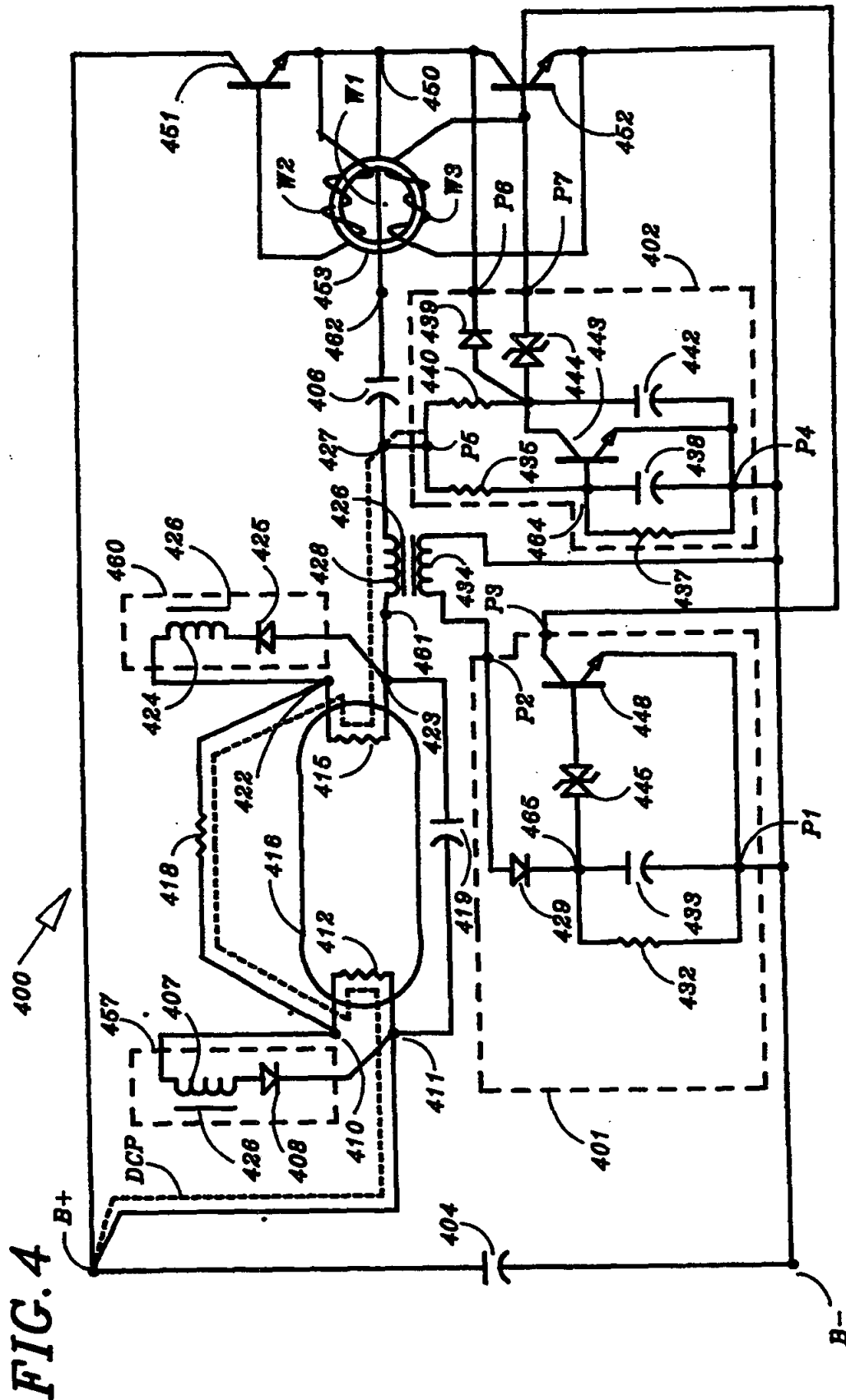
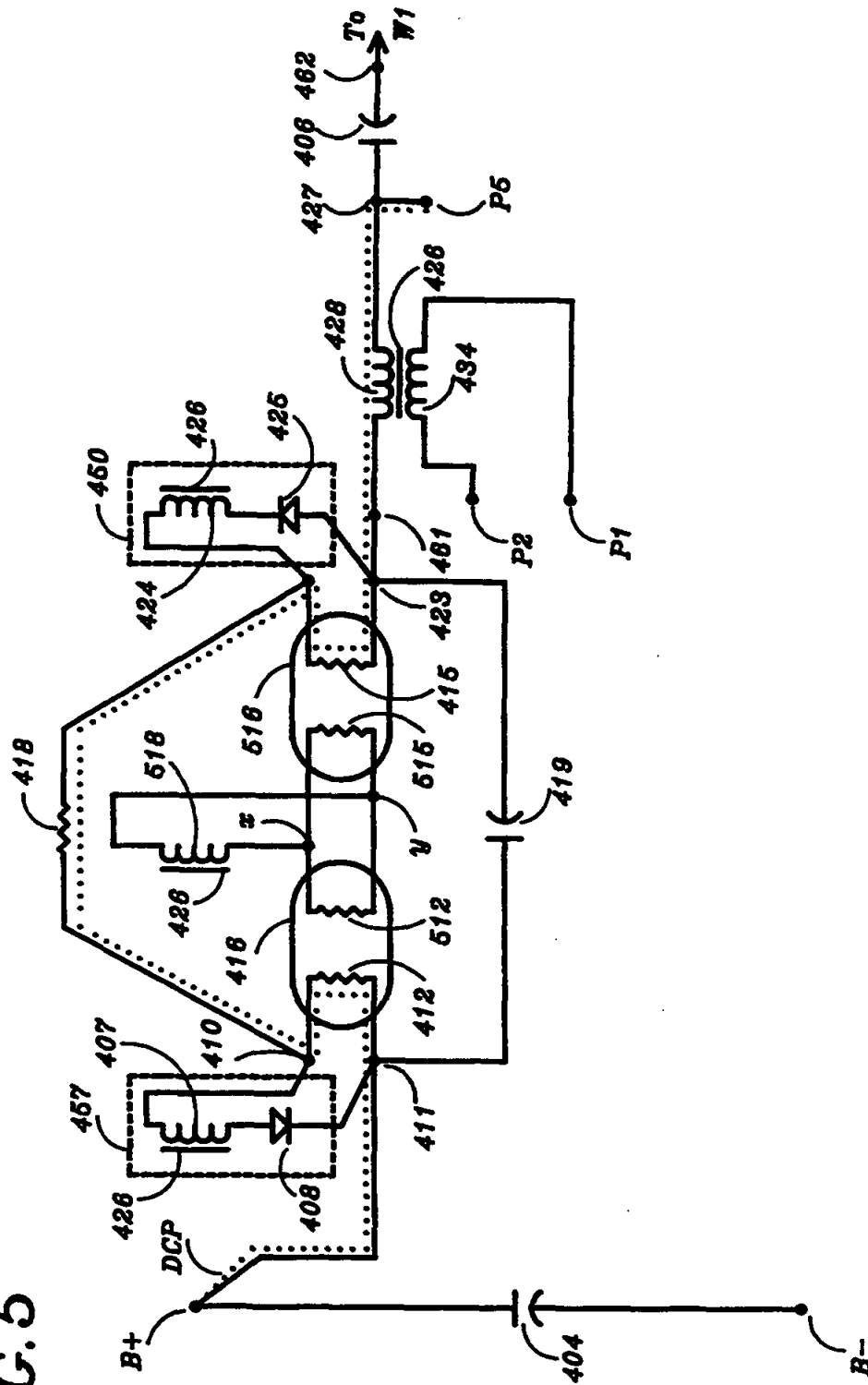


FIG. 5

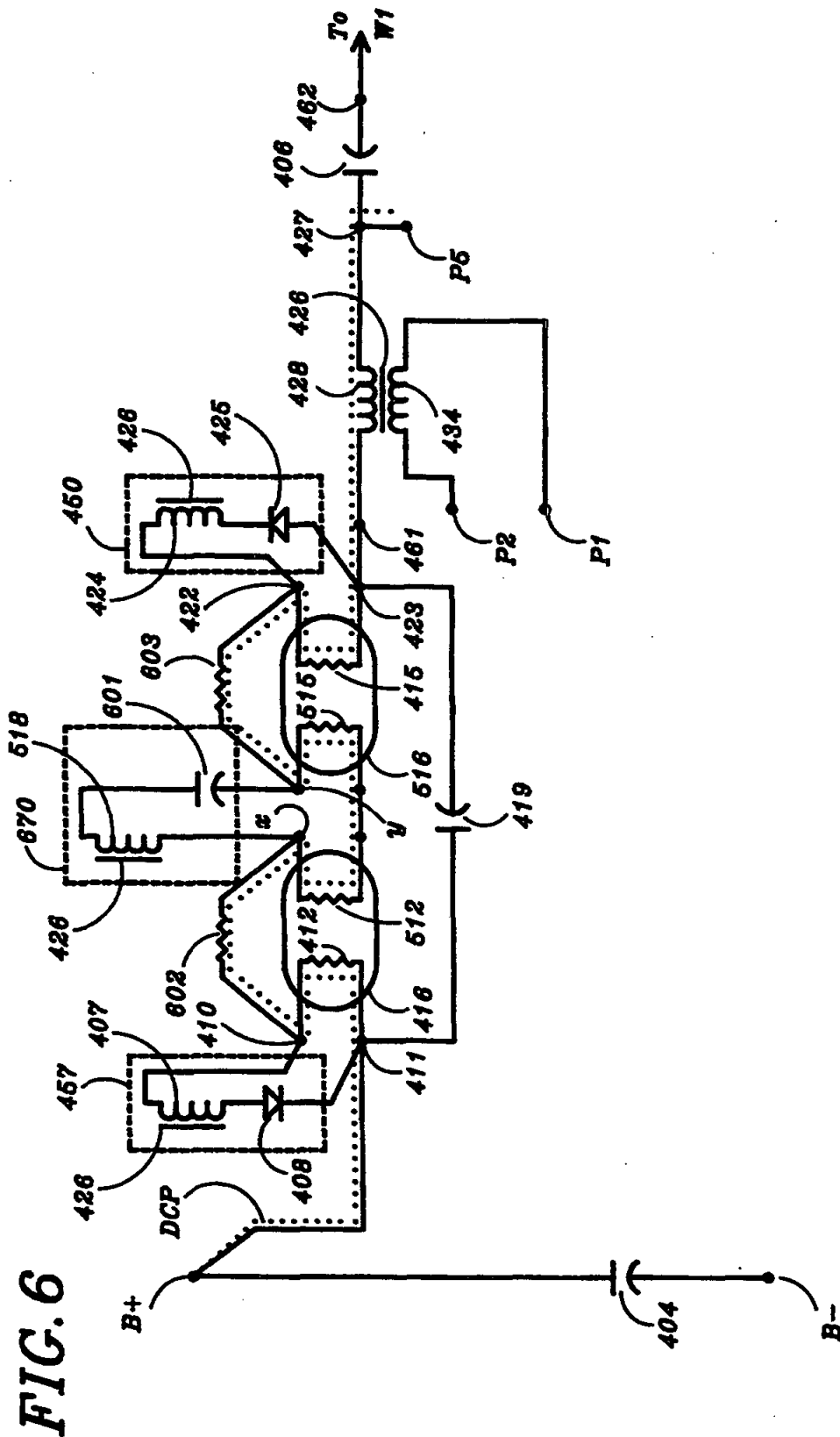


U.S. Patent

July 25, 1995

Sheet 5 of 7

5,436,529

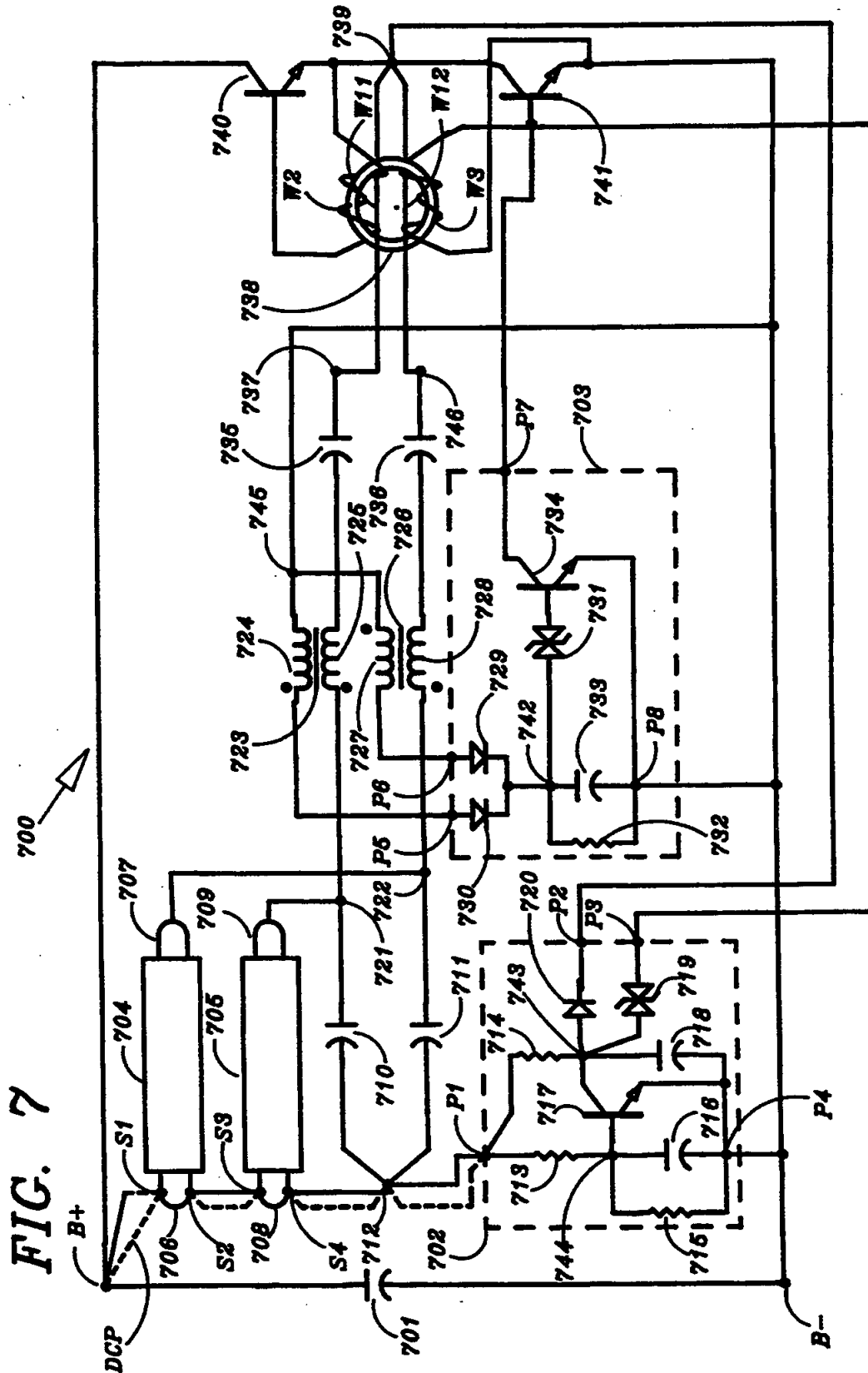


U.S. Patent

July 25, 1995

Sheet 6 of 7

5,436,529



U.S. Patent

July 25, 1995

Sheet 7 of 7

5,436,529

FIG. 8

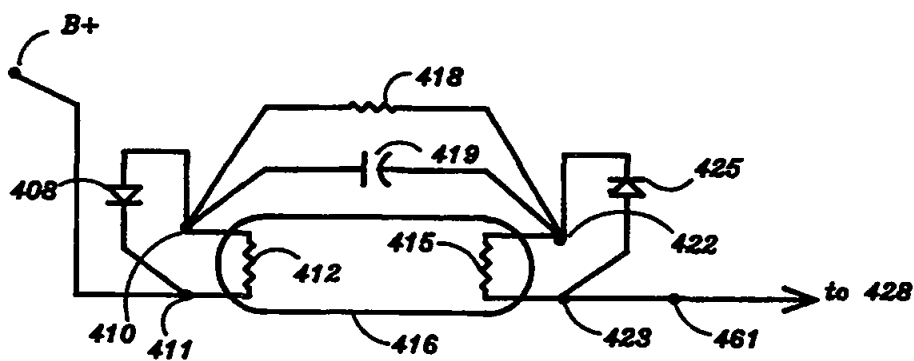
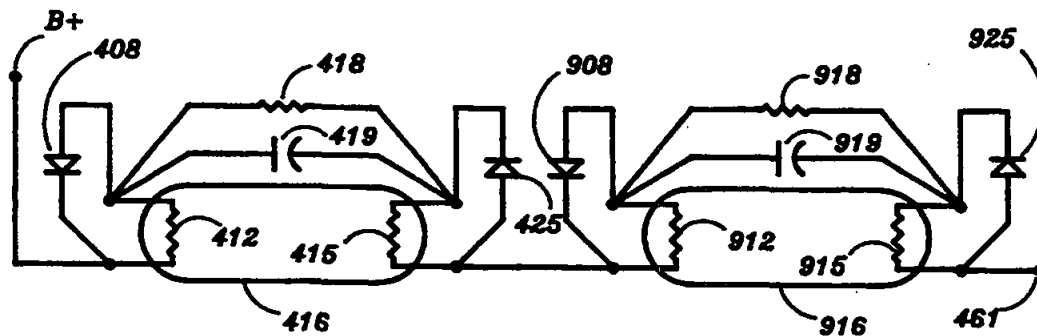


FIG. 9



5,436,529

1

CONTROL AND PROTECTION CIRCUIT FOR ELECTRONIC BALLAST

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of an earlier U.S. patent application Ser. No. 08/011,971 filed Feb. 1, 1993 now abandoned.

BACKGROUND OF THE INVENTION

It is common knowledge that application of a series-resonant inverter to power a gas discharge load is particularly ideal in regards to the inverter's matching properties with those of the gas discharge load. Especially, the properties like starting requirements and requirement of the waveform shape of the current supplied to the lamp load, are particularly favorable in respect to life duration of the lamp. (As described in U.S. Pat. No. 3,084,283 to Grunwaldt).

It is also known that in a series-resonant LC inverter, where the lamp load is connected across the resonant capacitor C, it is necessary to provide some means to protect the inverter from self-destruction, whenever the lamp fails to ignite or is removed out of its holders.

Furthermore, as is with all gas discharge lamp ballasts, the voltages required at the lampholders to start the lamps are so high as to potentially constitute a substantial electric shock hazard to persons having to service such ballasts.

To eliminate this hazard, whenever lampholders voltages exceed certain levels, protective measures have to be provided and shall be integrated in the ballast circuit design.

In the paper presented by McMurray, Shattuck: "Silicon-Controlled Inverter with Improved Commutation" at the AIEE Summer General Meeting, Ithaca, N.Y., Jun. 18-23, 1961, the authors described protection circuit for the series-resonant inverter with use of so called "feedback rectifiers" to return energy to a DC source. The most important drawback is that the inverter has large magnitude of current circulated within itself, thereby causing large power dissipation.

It will be most desirable to have a series-resonant inverter ballast circuit which (i) will not dissipate any power within itself when unloaded, and (ii) do not constitute a shock hazard to humans.

The circuits for protection of the series-resonant inverters have been described previously, notably in the following issued U.S. patents: U.S. Pat. No. 4,461,980 to Nilssen and U.S. Pat. No. 4,616,158 to Krummel et al.

In the Nilssen circuit, the ballast inverter is disabled within about one second after a lamp is removed from its lampholders, and the ballast is not taking any power, even though the power line voltage is applied. Whenever a new lamp is re-inserted, the power line voltage must be turned OFF and ON before the ballast will start the new lamp. It is a significant drawback and has not been accepted in the marketplace.

In the Krummel et al. circuit, the shut-off device provides for inverter shut-down in all abnormal load conditions. It also provides for strike of a new lamp after relamping without turning the power line voltage OFF and ON. After construction of the device for a power line voltage of 120 VAC, it has been discovered that the inverter's circulating current is of a large magnitude. The circulating current flows through the lamp filaments and filaments voltages are proportional to that

2

current and are also very high. This drawback is significant and limits the invention's scope of applications.

Based on the background outlined above, it is highly desirable to have a series-resonant ballast for gas discharge lamps, which: (a) will not draw power from a power line source whenever lamps are removed or inoperative; (b) will strike new lamps after relamping without turning power line voltage OFF and ON; (c) can be adapted to any lamp type and power line voltage magnitude; (d) will be very simple and easily manufacturable with high repeatability; and (e) will be inexpensive.

SUMMARY OF THE INVENTION

In accordance with the invention, there is provided an energy conversion device employing an oscillating resonant converter, having DC input terminals and adapted for powering at least one gas discharge lamp having heatable filaments, and comprising:

voltage source means able to provide constant or variable magnitude of a DC voltage between the DC input terminals;

output terminals for connection to the filaments of the gas discharge lamp;

one-shot trigger means coupled to the DC input terminals and to the resonant converter, and (i) able to receive a trigger control signal from the DC input terminals, and (ii) operable to provide one trigger pulse to effectively initiate the oscillations;

one-shot disable means coupled to the DC input terminals and to the resonant converter, and (i) able to receive a disable control signal from the resonant converter, and (ii) operable to provide one disable pulse to effectively disable the oscillations; and direct current blocking means coupled to the output terminals and operable to stop flow of the trigger control signal from the DC input terminals.

It will be understood that such a device as outlined above will provide a series-resonant ballast for gas discharge lamps. The ballast will not draw any power from a power line source whenever lamps are removed or inoperative and will ignite new lamps after relamping, without turning power line voltage OFF and ON. The circuit of the device is simple, inexpensive, and can be adapted to any lamp type and power line voltage magnitude.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 schematically illustrates the invention in its first embodiment;

FIG. 2 is a fragmentary illustration of an alternative version of the device of FIG. 1;

FIG. 3 is another fragmentary illustration of alternative version of the device of FIG. 1;

FIG. 4 schematically illustrates the invention in its second embodiment;

FIG. 5 is a fragmentary illustration of an alternative version of the device of FIG. 4;

FIG. 6 is another fragmentary illustration of an alternative version of the device of FIG. 4;

FIG. 7 schematically illustrates the invention in its third embodiment;

FIG. 8 is an alternative version of the device of FIG. 4; and

FIG. 9 is also an alternative version of the device of FIG. 4.

3

5,436,529

4

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. 1, a circuit 100, for powering a fluorescent lamp 16, has two DC input terminals B+, B- for receiving thereacross a DC supply voltage of approximately 250 Volts. Two capacitors 04, 06 (having equal values of approximately 47 uF) are connected in series between the DC input terminals B+, B- via a node 05.

A half-bridge inverter 54 has a bipolar transistor 51 (of the type MJE 13005) connected at its collector electrode to the positive DC input terminal B+. The transistor 51 has its emitter electrode connected to a node 50. A further transistor 52 (like the transistor 51, of the type MJE 13005) of the inverter 54 has its collector electrode connected to the node 50. The transistor 52 has its emitter electrode connected to the negative DC input terminal B-. A series-resonant circuit has a resonant capacitance 55 and a primary winding 28 of a resonant inductor 26 connected in series between the node 05 and a node 49 via an intermediate terminal 27.

A saturable feedback transformer 53 has a primary winding W1 (having one turn) and two secondary windings W2, W3 (each having approximately three turns) wound on a toroidal core. The primary winding W1 is connected in series with the primary winding 28 of the inductor 26, between the node 50 and the node 49. The secondary winding W2 is connected between a base electrode and the emitter electrode of the transistor 51. The secondary winding W3 is connected (with opposite polarity with respect to the secondary winding W2) between a base electrode and the emitter electrode of the transistor 52.

The resonant inductor 26 has secondary windings 07, 24 magnetically coupled to the primary winding 28 and has an inductance value of the primary winding 28 equal to approximately 1.75 mH.

The resonant capacitance 55 consists of two series-connected capacitors 19, 20 (having values of 47 nF and 18 nF respectively) via a node 21.

A diode 01 has its cathode connected to the terminal B+ and has its anode connected to the node 21. A further diode 02 has its cathode connected to the node 21 and has its anode connected to the terminal B-.

The fluorescent lamp 16 (as an ordinary rapid start lamp) has two heatable filaments 12, 13 and two pairs of connecting terminals 10, 11 and 22, 23, respectively. The terminal 11 is connected to the node 05, and the terminal 23 is connected to the intermediate terminal 27.

A resistor 18 is connected between terminals 10 and 22.

A DC blocking circuit 57 has a series connected secondary winding 07 with a capacitor 08, and is connected across terminals 10, 11 of the lamp 18.

A further DC blocking circuit 50 has a series connected secondary winding 24 with a capacitor 25, and is connected across terminals 22, 23 of the lamp 18.

A control circuit 58 has three control terminals CTa, CTb and CTc. The terminal CTa is connected to the intermediate terminal 27; the terminal CTb is connected to the terminal B-; and the terminal CTc is connected to the base electrode of the transistor 52.

The control circuit 58 has a first series current path between terminals CTa, CTb, and the path has a diode 39, a resistor 40, and a capacitor 42 connected in series, via a node 41 formed between the resistor 40 and the capacitor 42. A diac 44 is connected between the node

41 and the terminal CTc. A small signal npn transistor 43 is connected with its collector electrode to the node 41, and with its emitter electrode to the terminal CTb.

The control circuit 58 has a second series current path between terminals CTa, CTb, and the path has a diode 34, a resistor 35, and a capacitor 38 connected in series via a node 36 formed between the resistor 35 and the capacitor 38. The transistor 43 has its base electrode connected to the node 36. A resistor 37 is connected between the node 36 and the terminal CTb.

The control circuit 58 has a third series current path between terminals CTa, CTb, and the path has a diode 29, a resistor 30, and a capacitor 33 connected in series via a node 31 formed between the resistor 30 and the capacitor 33. A resistor 32 is connected to the node 31 and to the terminal CTb.

A small signal npn transistor 48 has its collector electrode connected to the terminal CTc and its emitter electrode connected to the terminal CTb. A diac 45 is connected between the node 31 and a base electrode of the transistor 48.

Referring now to FIG. 2, a circuit 200 is a fragmentary illustration of the variation of FIG. 1. The fluorescent lamp 16 of the circuit 100 illustrated in FIG. 1, is replaced with two lamps 216, 217 connected in series. Two additional terminals x, y are formed between these two lamps, due to parallel connection of two additional filaments 213, 214, which are associated with these lamps.

Referring now to FIG. 3, a circuit 300 is another alternative variation illustrated in circuit 100 of the FIG. 1. The fluorescent lamp 16 of FIG. 1 is replaced with two lamps 311, 306. The lamp 311 has its two filaments 12, 312 and two pairs of terminals 10, 11 and 307, 309 associated with the filaments, respectively. The lamp 306 has its two filaments 313, 15 and two pairs of terminals 308, 310 and 22, 23 associated with the filaments respectively. The filaments 312 and 313 are connected in series by connecting the terminal 309 to terminal 310.

A DC blocking circuit 301 has a secondary winding 304 of the inductor 26 connected in series with a capacitor 307. The circuit 301 is connected between terminals 307, 308.

A resistor 302 is connected between terminals 10, 307, and another resistor 303 is connected between terminals 308, 22.

The capacitor 08 of FIG. 1 can be replaced with a semiconductor diode having its cathode connected to terminal 1. Also, the capacitor 25 of FIG. 1 can be replaced with a semiconductor diode, having its anode connected to terminal 23.

Referring now to FIG. 4, a circuit 400, for powering a fluorescent lamp 416, has two DC input terminals B+, B- for receiving thereacross a DC supply voltage.

A capacitor 404, (having value of approximately 47 uF) is connected between the DC input terminals B+, B-.

A half bridge inverter 454 has a bipolar transistor 451 connected at its collector electrode to the positive DC input terminal B+. The transistor 451 has its emitter electrode connected to a node 450. A further transistor 452 of the inverter 454 has its collector electrode connected to the node 450. The transistor 452 has its emitter electrode connected to the negative DC input terminal B-.

A series-resonant circuit has a resonant capacitance 419, a primary winding 428 of a resonant inductor 426,

5,436,529

5

and a ballasting capacitor 406. All are connected in a series circuit between terminal B+ and the node 450 via intermediate terminals 461, 427, and 462, respectively.

A saturable feedback transformer made with a toroidal core 453 has a primary winding W1 (having one turn) connected in circuit with the primary winding 428, and has two secondary windings W2, W3 connected respectively to base-emitter junctions of the transistors 451 and 452.

The resonant inductor 426 has filament heating secondary windings 407, 424, and a disable sensing secondary winding 434 magnetically coupled with the primary winding 428.

The fluorescent lamp 416 (as an ordinary rapid start lamp) has two heatable filaments 412, 415 and two pairs of connecting terminals 410, 411 and 422, 423, respectively. The terminal 411 is connected to the terminal B+, and the terminal 423 is connected to the intermediate terminal 461.

A DC current blocking circuit 457 has a series connected secondary winding 407 with a diode 408 and is connected across terminals 410, 411 of the lamp 416.

A further DC current blocking circuit 460 has a series connected secondary winding 424 with a diode 425 and is connected across terminals 422, 423 of the lamp 416.

A one-shot trigger circuit 402 has four pin-terminals P4, P5, P6 and P7. The pin-terminal P4 is connected to the terminal B-, the pin-terminal P5 is connected to the intermediate terminal 427 (and equivalently to the terminal 462 or terminal 461), the pin-terminal P6 is connected to the node 450, and the pin-terminal P7 is connected to a base electrode of the transistor 452.

The one-shot trigger circuit 402 has a first current path between pin-terminals P5 and P4, and the path has a resistor 440 and a capacitor 442 connected in series via a node 463. A diac 444 is connected between the node 463 and the pin-terminal P7. A small signal npn transistor 443 is connected with its collector electrode to the node 463, and with its emitter electrode to the pin-terminal P4. A diode 439 is connected between the node 463 and the pin-terminal P6.

The one-shot trigger circuit 402 has a second current path between pin-terminals P5 and P4, and the path has a resistor 435 and a capacitor 438 connected in series via a node 464. A resistor 437 is connected between the node 464 and the pin-terminal P4. Also, the small signal transistor 443 has its base electrode connected to the node 464.

A one-shot disable circuit 410 has an input pin-terminal P2, has an output pin-terminal P3, and has a ground pin-terminal P1. The disable sensing secondary winding 434 of the resonant inductor 426, is connected across pin-terminals P2 and P1. The output pin-terminal P3 is connected to a base electrode of the inverter transistor 452.

The one-shot disable circuit 401 has an input current path between pin-terminals P2 and P1, and the path has a diode 429 and a capacitor 433 connected in series via a node 465. A resistor 432 is connected between the node 465 and the pin-terminal P1. An output transistor 448 has its collector electrode connected to the pin-terminal P3, and has its emitter electrode connected to the ground pin-terminal P1. A diac 445 is connected between the node 465 and a base electrode of the transistor 448.

Referring now to FIG. 5, a circuit 500 is a fragmentary illustration illustrated in variation of circuit 400 of the FIG. 4. An additional lamp 516 is connected in

6

series with lamp 416. Two additional terminals x, y are formed between these two lamps, due to parallel connection of two additional filaments 512, 515, which are associated with these lamps. Also, an additional filament heating winding 518 is connected across the terminals x, y. The winding 518 is magnetically coupled with the resonant inductor 426.

Referring now to FIG. 6, a circuit 600 is a fragmentary illustration of circuit 500 illustrated in FIG. 5. The lamp 516 is connected in series with the lamp 416. Two additional terminals x, y are formed between these two lamps due to series connection of two additional filaments 512, 515 which are associated with these lamps.

A DC current blocking circuit 670 as a the secondary winding 518 connected in series with a capacitor 601. The circuit 670 is connected between terminals x and y. A resistor 602 is connected between terminals 410 and x. A resistor 603 is connected between terminals y and 422.

Referring now to FIG. 7, a circuit 700 for powering two fluorescent lamps 704, 705 has two DC input terminals B+, B- for receiving thereacross a DC supply voltage.

A capacitor 701 is connected between terminals B+, B-.

A half bridge inverter 750 has a bipolar transistor 740 connected at its collector electrode to the positive DC input terminal B+. The transistor 740 has its emitter electrode connected to a node 739. A further transistor 741 of the inverter 750 has its collector electrode connected to the node 739. The transistor 741 has its emitter electrode connected to the negative DC input terminal B-.

The fluorescent lamps 704 and 705 (as ordinary instant start type) have their ends equipped with conductive pin-type terminals 706, 707 and 708, 709, respectively. The terminals 706 and 708 are placed in circuit interrupting lampholders and contact terminals S1, S2 and S3, S4 associated with them respectively. A connection is provided between terminal B+ and an intermediate terminal 712 via: contact S1, pin-type terminal 706, contact S2, contact S3, pin-type terminal 708, and contact S4.

A first series-resonant circuit is connected between the intermediate terminal 712 and the node 739 and comprising serially connected: a capacitor 710, a primary winding 725 of the inductor 723, a capacitor 735, and a primary winding W11 associated with a feedback transformer 738.

A second series-resonant circuit is connected between the intermediate terminal 712 and the node 739 and comprising serially connected: a capacitor 711, a primary winding 728 of the inductor 726, a capacitor 736, and a primary winding W12 associated with the feedback transformer 738.

The terminal 707 of the lamp 704 is connected to intermediate node 721 formed between the capacitor 710 and the winding 725.

The terminal 709 of the lamp 705 is connected to intermediate node 722 formed between the capacitor 711 and the primary winding 728.

The feedback transformer 738 has secondary windings W2 and W3 connected to base-emitter junctions of the transistors 740 and 741, respectively.

A one-shot trigger circuit 702 has four pin-terminals P1, P2, P3 and P4. The pin-terminal P4 is connected to the terminal B-, the pin-terminal P1 is connected to the intermediate terminal 712, the pin-terminal P2 is

5,436,529

7

connected to the intermediate node 739, and the pin-terminal P3 is connected to a base electrode of the transistor 741.

The one-shot trigger circuit 702 has a first current path between pin-terminals P1 and P4, and the path has a resistor 714 and a capacitor 718 connected in series via a node 743. A diac 719 is connected between the node 743 and the pin-terminal P3. A small signal npn transistor 717 is connected with its collector electrode to the node 743, and with its emitter electrode to the pin-terminal P4. A diode 720 is connected between the node 743 and the pin-terminal P2.

The one-shot trigger circuit 702 has a second current path between pin-terminals P1 and P4, and the path has a resistor 713 and a capacitor 716 connected in series via a node 744. A resistor 715 is connected between the node 744 and the pin-terminal P4. Also, the small signal transistor 717 has its base electrode connected to the node 744.

A one-shot disable circuit 703 has two input pin-terminals P5, P6, has an output pin-terminal P7, and has a ground pin-terminal P8. The resonant inductors 723, 726 are equipped with disable sensing secondary windings 724, 727, respectively. The windings 724 and 727 are polarized and connected in series (adding) mode via a node 745. The node 745 is connected to the ground pin-terminal P8. The windings 724 and 727 are connected to the input pin-terminals P5, P6, respectively. The output pin-terminal P7 is connected to a base electrode of the inverter transistor 741.

The one-shot disable circuit 703 has a first input current path between pin-terminals P5 and P8, and the path has a diode 730 and a capacitor 733 connected in series via a node 742. A resistor 732 is connected between the node 742 and the pin-terminal P8. The one-shot disable circuit 703 has a second current path between the pin-terminals P6 and P8, and the path has a diode 729 and the capacitor 733 connected in series via the node 742. An output transistor 734 has its collector electrode connected to the pin-terminal P7, and has its emitter electrode connected to the ground pin-terminal P8. A diac 731 is connected between node 742 and a base electrode of the transistor 734.

DETAILS OF OPERATION

Device of FIG. 1

Mode A

The device receives a DC voltage at the DC input terminals B+, B- and the capacitors 04, 06 are charged to a magnitude approximately equal to one-half of the DC voltage. Then, DC current starts to flow in the direct current path DCP from terminal B+ through: resistor 09, filament 12, resistor 18, filament 15, diode 39, resistor 40 to charge the capacitor 42 within the time period of T1 associated with values of the resistors and the capacitor. Whenever the voltage across the capacitor 42 will reach a level above breakover voltage of the diac 44, the diac turns ON the transistor 52. An alternating current will start to flow in the resonant circuit which includes the resonant inductor 26 and the resonant capacitance 55. With a feedback signal provided by the saturable feedback transformer 53, the device will start to oscillate. The filaments 12 and 15 are heated by current flow resulting from application of voltages by the windings 07 and 24, respectively. A relatively high voltage is developed across both resonant elements. Whenever a magnitude of peak voltage between the nodes 21 and 05 reaches a level of the DC voltage

8

present across the capacitor 04 or 06, the voltage applied to fluorescent lamp will be proportional to that voltage and is predetermined by a ratio of the values of the capacitors 19 and 20. The voltage applied to the lamp 16 causes the lamp to strike, and voltages across both resonant elements become lower accordingly. During the time period T1, a DC current will flow in another DC current path from terminal B+ through: resistor 09, filament 12, resistor 18, filament 15, diode 34, resistor 35 to charge capacitor 38 within a time period T2 dependent on values of the resistors in the path, value of the resistor 37, and value of the capacitor 38. When the voltage across the capacitor reaches a level sufficient enough to turn ON the transistor 43, the capacitor 42 will be held discharged for any time period as long as: (i) there is an unbroken direct current path DCP between terminal B+ and terminal CTa; (ii) the device oscillates and charging currents to the capacitors 42 and 38 are provided by an AC voltage potential associated with the intermediate terminal 27 in reference to terminal B-.

Mode B

While the device is operational as in Mode A, if the fluorescent lamp 16 is removed out of its holders, the AC voltage potential associated with the intermediate terminal 27 will rise, as this is natural behavior of the series-resonant circuit. A current will flow in the third series path of the control circuit 58 from terminal CTa through: diode 29, resistor 30, resistor 32 to charge capacitor 33 to a voltage level predetermined by values of the resistors in a predetermined time period associated with value of the capacitor 33. When the voltage across the capacitor 33 is greater than breakover voltage of the diac 45, the diac turns ON the transistor 48 for a brief period. As a result, the transistor 48 turns OFF the device and oscillations cease. The direct current path DCP between terminal B+ and terminal CTa is broken due to missing filaments 12, 15 of the lamp 16. The DC current will not flow through DC blocking circuits 57, 50, and the starting capacitor 42 will not be charged. Thus, the device will never start to oscillate on its own.

Mode C

The fluorescent lamp 16 is now re-inserted into its holders, that will complete the direct current path DCP between terminal B+ and terminal CTa, and the device will start as in Mode A above.

The above modes of operation all apply to the circuit of FIG. 2 as the alternative version of the circuit of FIG. 1. The difference is the direct current path DCP is now associated with two lamps 216, 217 connected in series. It will be enough to remove only one of the two lamps (as in Mode B), and the device will be turned OFF by the control circuit 58. Of course, it will be enough to re-insert that one lamp (as in Mode C) to provide for normal start-up and operation of the device.

Also, all above modes of operation apply to the circuit of FIG. 3 as another alternative version of the circuit of FIG. 1. The DC current path DCP between terminal B+ and terminal CTa is here associated with all four filaments 12, 312, 313, and 15 of the two lamps 311, 306. The filaments are connected in series circuit in the path. It will be enough to remove at least one end of at least one lamp (as in Mode B), and the device will be turned OFF by the control circuit 58. Of course, it will

9

be enough to re-insert that one end of the lamp (as in Mode C) to provide for normal start-up and operation of the device.

Operation of the Device of FIG. 4

Mode A

At power up, the direct current starts to flow in the direct current path DCP from terminal B+ through: filament 412, resistor 418, filament 415, winding 428, resistor 440 to charge capacitor 442. After predetermined time T1, when the voltage across capacitor 442 reaches a level high enough to cause the diac 444 to breakover, the transistor 452 is turned ON, and the device starts to oscillate. When the transistor 452 is turned ON periodically and alternately with the transistor 451, the charge from the capacitor 442 is removed with every oscillation cycle through diode 439. Also, the capacitor 438 is charged through a direct current path DCP and the resistor 435 to provide a signal to the base of the transistor 443. After a predetermined time T2, which is longer than T1, when the voltage across capacitor 438 will reach a level sufficient enough to turn ON the transistor 443, the trigger capacitor 442 will be held discharged for any time period as long as: (i) there is an unbroken direct current path DCP between terminal B+ and the pin-terminal P5, and DC voltage is present at all times between terminals B+, B-; (ii) the device oscillating and charging currents to the capacitors 442 and 438 are provided by an AC voltage potential associated with the intermediate terminal 427 in reference to the terminal B-.

The trigger circuit 402 arranged as above provides only one trigger pulse per power-up, to initiate the oscillations of the device.

Mode B

While the device is operational as in Mode A, when the fluorescent lamp 416 is removed from its holders voltage magnitude across the winding 434 rises dramatically, as this is natural behavior of the series-resonant circuit. The sensing winding 434 provides charging current to the capacitor 433, and voltage across that capacitor rises. Whenever that voltage reaches a level high enough to breakover the diac 445, the transistor 448 is turned ON for a brief period, and oscillations of the device are stopped. The direct current path DCP between terminal B+ is broken due to missing filaments 412, 415 of the lamp 416. The direct current will not flow through DC blocking circuits 457, 460, and the starting capacitor 442 of the trigger circuit 402 will never get charged. Thus, the device will never start to oscillate on its own.

Mode C

The fluorescent lamp 416 is now re-inserted into its holders, and that will complete the direct current path DCP between terminal B+ and the pin-terminal P5 of the trigger circuit 402, and the device will be triggered into oscillation as in Mode A.

The above modes of operation all apply to the circuit of FIG. 5 as the alternative version of the circuit of FIG. 4. The difference is that the direct current path DCP is now associated with two lamps 416, 516 connected in series. It will be enough to remove only one of the two lamps (as in Mode B), and the oscillations of the device will be stopped by the one-shot disable circuit 401. Of course, it will be enough to re-insert that one lamp (as in Mode C) to provide for normal initiation of

5,436,529

10

the oscillations and operation of the device as in Mode A.

Furthermore, all of the above modes of operation apply to the circuit of FIG. 6 as another alternative version of the circuit of FIG. 4. The direct current path DCP between terminal B+ and the pin-terminal P5 is here associated with all four filaments 412, 512, 515, 415 of the two lamps 416, 516. The filaments are connected in a series circuit path. It will be enough to remove at least one end of at last one lamp (as in Mode B), and the oscillations of the device will be stopped by a one-shot sensing circuit 401. Of course, it will be enough to re-insert that one end of the lamp (as in Mode C) to provide for normal initiation of the oscillations and operation of the device as in Mode A.

Operation of the Device of FIG. 7

Mode A

At power up, the direct current starts to flow in the direct current path DCP from terminal B+ through: internal and external wiring, contact S1, lamp pin-terminal 706, contact S2, contact S3, lamp pin-terminal 708, contact S4, and resistor 714 to charge trigger capacitor 718. After a predetermined time T1, when the voltage across capacitor 718 reaches a level high enough to cause the diac 719 to breakover, the transistor 741 is turned ON, and the device starts to oscillate. When the transistor 741 is turned ON periodically and alternately with the transistor 740, the charge from the capacitor 718 is removed with every oscillation cycle through diode 720. Also, the capacitor 716 is charged through direct current path DCP and the resistor 713 to provide a signal to the base of the transistor 717. After a predetermined time T2, which is longer than T1, when the voltage across capacitor 716 will reach a level sufficient enough to turn ON the transistor 717, the trigger capacitor 718 will be held discharged for any time period as long as there is an unbroken direct current path DCP between the terminal B+ and the pin-terminal P1 of the trigger circuit 702, and DC voltage is present at all times between the terminals B+, B-.

The trigger circuit 702 arranged as above provides only one relatively short trigger pulse per power-up of the device, to effectively initiate the oscillations.

Mode B

While the device is operational as in Mode A, when one of the lamps (704) is removed from its holders, voltage magnitude across winding 727 rises dramatically, as this is natural behavior of the series-resonant circuit. The sensing winding 727 provides a charging current to the capacitor 733, and voltage across that capacitor rises. Whenever that voltage reaches a level high enough to breakover the diac 731, the transistor 734 is turned ON for a brief period, and oscillations of the device are stopped. The direct current path DCP between the terminal B+ is broken due to missing lamp 704 and associated with it pin-terminal 706. The direct current will not flow in direct current path DCP, and the trigger capacitor 718 of the trigger circuit 702 will never get charged. Thus, the device will never start to oscillate on its own.

Mode C

The fluorescent lamp 704 is now re-inserted into its holders, and that will complete the direct current path DCP between terminal B+ and the pin-terminal P1 of

5,436,529

11

the trigger circuit 702, and the device will be triggered into oscillation as in Mode A.

The circuit of FIG. 1 and all of its alternative variations, equipped with the control circuit and equipped with DC current blocking circuits coupled across at least one filament of at least one lamp provides for an ideally controlled series-resonant ballast for gas discharge lamps.

The control circuits, as described in the present invention, provide superb protection for the ballast in all fault modes like: starting lamps in very low temperatures, end of lamp life and all behaviors associated with it, power-up with, so-called, degased lamps and more.

Furthermore, the circuit of FIG. 4 and all of its alternative variations, equipped with one-shot trigger circuits and one-shot disable circuits, and equipped with DC blocking circuits coupled across at least one filament of at least one lamp, provide for an ideally controlled series-resonant ballast for gas discharge lamps.

The ballast constructed as described above (i) will not oscillate and will not draw any power from a supply voltage source whenever lamps are removed or inoperative; (ii) will ignite new lamps after relamping, without turning voltage source OFF and ON; (iii) can be adapted to any lamp type and any power line voltage magnitude; (iv) will be very simple, easily manufacturable and inexpensive.

It will be understood, that all other circuit arrangements, for example: one lamp type device similar to that described in FIG. 7 and equipped with the control circuit of FIG. 1, is another alternative version, and is another embodiment of this invention.

It will be understood, that all other types of oscillatory circuits, either self-oscillatory or driven, half-bridge or full bridge type, fly-back, forward or Class E type—can be equipped with presently described control circuits, one-shot trigger, one-shot disable and DC blocking circuits, and all combinations thereof.

It is believed that the present invention and its several attendant advantages and features will be understood from the preceding description. However, without departing from the spirit of the invention, changes may be made in its form and in the construction and interrelationships of its components parts, the form herein presented merely representing the presently preferred embodiments.

I claim:

1. An energy conversion device employing an oscillating resonant converter producing oscillations, having DC input terminals producing a control signal and adapted to power at least one gas discharge lamp having heatable filaments, the device comprising:

voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals;

output terminals connected to the filaments of the gas discharge lamp;

control means capable of receiving control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective.

12

2. The device according to claim 1 wherein the resonant converter comprises a capacitor and an inductor connected in series via an intermediate node.

3. The device according to claim 2 wherein the control means is connected to receive the control signal from the intermediate node.

4. The device according to claim 3 wherein the control means receives the control signal from the DC input terminals and the signal flows through the output terminals and the intermediate node.

5. The device according to claim 1 wherein the direct current blocking means includes a capacitor and is connected effectively across at least one heatable filament of at least one gas discharge lamp.

6. An energy conversion device employing oscillating resonant converter, having DC input terminals and adapted to power at least one gas discharge lamp having heatable filaments, and comprising:

voltage source means able to provide constant or variable magnitude of a DC voltage between the DC input terminals;

output terminals for connection to the filaments of at least one gas discharge lamp;

one-shot trigger means coupled to the DC input terminals and to the resonant converter, and (i) able to receive a trigger control signal from the DC input terminals, and (ii) operable to provide one trigger pulse to effectively initiate the oscillations;

one-shot disable means magnetically coupled to the resonant converter, and (i) able to receive a disable control signal from the resonant converter, and (ii) operable to provide one disable pulse to effectively stop the oscillations; and

direct current blocking means coupled to the output terminals and effectively across at least one heatable filament of at least one lamp, and operable to stop flow of the trigger control signal from the DC input terminals, whenever at least one end of at least one lamp is removed from the output terminals or the lamp is defective.

7. Device according to claim 6 wherein the resonant converter comprises an inductor equipped with a primary winding and magnetically coupled secondary winding.

8. Device according to claim 7 wherein the one-shot trigger means receives the trigger control signal and the signal flows through the output terminals and the primary winding.

9. Device according to claim 7 wherein the one-shot disable means receives the disable control signal from the secondary winding of the inductor.

10. Device according to claim 6 wherein the direct current blocking means include a capacitor and are connected effectively across at least one heatable filament of at least one gas discharge lamp.

11. Device according to claim 6 wherein the direct current blocking means include a semiconductor diode and are connected effectively across at least one heatable filament of at least one gas discharge lamp.

12. An energy conversion device employing at least one oscillating resonant converter, having DC voltage input terminals, adapted to power at least one gas discharge lamp, and comprising:

voltage source means able to provide constant or variable magnitude of a DC voltage between the DC input terminals;

output terminals for connection to at least one gas discharge lamp;

5,436,529

13

one-shot trigger means coupled to the DC input terminals and to the output terminals, and (i) able to receive a trigger control signal from the DC input terminals, and (ii) operable to provide one trigger pulse to effectively initiate the oscillations;

one-shot disable means magnetically coupled to each and every one of the resonant converters, and (i) able to receive a disable control signal from each and every one of the resonant converters, and (ii) operable to provide one disable pulse to effectively stop the oscillations; and

disconnect means coupled to the DC input terminals and to the output terminals, and operable to stop flow of the trigger control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals.

13. Device according to claim 12 wherein each an every one resonant converter is having an inductor equipped with a primary winding and magnetically coupled secondary winding.

14. Device according to claim 12 wherein the one-shot disable means receives the disable signal from the secondary winding.

15. Device according to claim 12 wherein the disconnect means comprises an internal and external wiring arranged to disconnect each and every one of the resonant converters from the DC input terminals whenever at least one lamp is removed from the output terminal.

16. Device according to claim 12 wherein the one-shot trigger means receives the trigger control signal, and the signal flows through the disconnect means and through the output terminal.

17. An energy conversion device employing at least one oscillating resonant converter, having DC input terminals and adapted to power at least one gas discharge lamp having heatable filaments, and comprising: voltage source means able to provide constant or variable magnitude of a DC voltage between the DC input terminals;

output terminals for connection to the filaments of at least one gas discharge lamp;

14

one-shot trigger means coupled to the DC input terminals and to each and every one of the resonant converters, and (i) able to receive a trigger control signal from the DC input terminals, and (ii) operable to provide one trigger pulse to effectively initiate the oscillations;

one-shot disable means magnetically coupled to each and every one of the resonant converters, and (i) able to receive a disable control signal from each and every one of the resonant converters, and (ii) operable to provide one disable pulse to effectively stop the oscillations; and

direct current blocking means coupled to the output terminals and effectively across at least one heatable filament of at least one lamp, and operable to stop flow of the trigger control signal from the DC input terminals, whenever at least one end of at least one lamp is removed from the output terminals or the lamp is defective.

18. An energy conversion device employing an oscillating resonant converter, having DC input terminals and adapted for powering at least one gas discharge lamp having heatable filaments, the device comprising:

voltage source means able to provide a constant or variable magnitude DC voltage between the DC input terminals;

output terminals for connection to the filaments of the gas discharge lamp;

control means able to receive control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and

direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective wherein the direct current blocking means includes a semiconductor diode and is connected effectively across at least one heatable filament of at least one gas discharge lamp.

* * * * *

**IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION**

LIGHTING BALLAST CONTROL LLC,)	
)	
Plaintiff,)	
)	
v.)	
)	C.A. No. 7:09-cv-00029-O
ADVANCE TRANSFORMER CO., FULHAM,)	
CO., INC., GENERAL)	
ELECTRIC COMPANY, and UNIVERSAL)	
LIGHTING TECHNOLOGIES, INC.,)	
)	
Defendants.)	

STIPULATED PROTECTIVE ORDER

Proceedings and Information Governed.

1. This Order ("Protective Order") is made under Fed. R. Civ. P. 26(c). It governs any document, information, or other thing furnished by any party to any other party, and it includes any non-party who receives a subpoena in connection with this action. The information protected includes, but is not limited to: answers to interrogatories; answers to requests for admission; responses to requests for production of documents; deposition transcripts and videotapes; deposition exhibits; and other writings or things produced, given or filed in this action that are designated by a party as "Confidential Information" or "Confidential Attorney Eyes Only Information" in accordance with the terms of this Protective Order, as well as to any copies, excerpts, abstracts, analyses, summaries, descriptions, or other forms of recorded information containing, reflecting, or disclosing such information.

Designation and Maintenance of Information.

2. For purposes of this Protective Order, (a) the "Confidential Information" designation means that the document is comprised of trade secrets or commercial information that is not

publicly known and is of technical or commercial advantage to its possessor, in accordance with Fed. R. Civ. P. 26(c)(7), or other information required by law or agreement to be kept confidential and (b) the "Confidential Attorney Eyes Only" designation means that the document is comprised of information that the producing party deems especially sensitive, which may include, but is not limited to, confidential research and development, financial, technical, marketing, any other sensitive trade secret information, or information capable of being utilized for the preparation or prosecution of a patent application dealing with such subject matter. Confidential Information and Confidential Attorney Eyes Only Information does not include, and this Protective Order does not apply to, information that is already in the knowledge or possession of the party to whom disclosure is made unless that party is already bound by agreement not to disclose such information, or information that has been disclosed to the public or third persons in a manner making such information no longer confidential.

3. Documents and things produced during the course of this litigation within the scope of paragraph 2(a) above, may be designated by the producing party as containing Confidential Information by placing on each page and each thing a legend substantially as follows:

CONFIDENTIAL INFORMATION

SUBJECT TO PROTECTIVE ORDER

Documents and things produced during the course of this litigation within the scope of paragraph 2(b) above may be designated by the producing party as containing Confidential Attorney Eyes Only Information by placing on each page and each thing a legend substantially as follows:

CONFIDENTIAL ATTORNEY EYES ONLY INFORMATION

SUBJECT TO PROTECTIVE ORDER

“A legend that omits “SUBJECT TO PROTECTIVE ORDER” shall nevertheless be considered to be in substantial compliance with this provision.” A party may designate information disclosed at a deposition as Confidential Information or Confidential Attorney Eyes Only Information by requesting the reporter to so designate the transcript or any portion of the transcript at the time of the deposition. If no such designation is made at the time of the deposition, any party will have fourteen (14) calendar days after the date of the deposition to designate, in writing to the other parties and to the court reporter, whether the transcript is to be designated as Confidential Information or Confidential Attorneys Eyes Only Information. If no such designation is made at the deposition or within this fourteen (14) calendar day period (during which period, the transcript must be treated as Confidential Attorneys Eyes Only Information, unless the disclosing party consents to less confidential treatment of the information), the entire deposition will be considered devoid of Confidential Information or Confidential Attorneys Eyes Only Information. Each party and the court reporter must attach a copy of any final and timely written designation notice to the transcript and each copy of the transcript in its possession, custody or control, and the portions designated in such notice must thereafter be treated in accordance with this Protective Order. It is the responsibility of counsel for each party to maintain materials containing Confidential Information or Confidential Attorney Eyes Only Information in a secure manner and appropriately identified so as to allow access to such information only to such persons and under such terms as is permitted under this Protective Order.

Inadvertent Failure to Designate.

4. The inadvertent failure to designate or withhold any information as confidential or privileged will not be deemed to waive a later claim as to its confidential or privileged nature, or to stop the producing party from designating such information as confidential at a later date in writing and with particularity. The information must be treated by the receiving party as confidential from the time the receiving party is notified in writing of the change in the designation.

Challenge to Designations.

5. A receiving party may challenge a producing party's designation at any time. Any receiving party disagreeing with a designation may request in writing that the producing party change the designation. The producing party will then have ten (10) business days after receipt of a challenge notice to advise the receiving party whether or not it will change the designation. If the parties are unable to reach agreement after the expiration of this ten (10) business day time-frame, and after the conference required under LR 7.1(a), the receiving party may at any time thereafter seek an order to alter the confidential status of the designated information. Until any dispute under this paragraph is ruled upon by the presiding judge, the designation will remain in full force and effect, and the information will continue to be accorded the confidential treatment required by this Protective Order.

6. **Disclosure and Use of Confidential Information.**

7. Information designated as Confidential Information or Confidential Attorney Eyes Only Information may only be used for purposes of preparation, trial, and appeal of this action. Confidential Information or Confidential Attorney Eyes Only Information may not be used

under any circumstances for prosecuting any patent application, for patent licensing, or for any other purpose.

8. Subject to paragraph 9 below, Confidential Information may be disclosed by the receiving party only to the following individuals, provided that such individuals are informed of the terms of this Protective Order: (a) two (2) employees of the receiving party who are required in good faith to provide assistance in the conduct of this litigation, including any settlement discussions, and who are identified as such in writing to counsel for the designating party in advance of the disclosure; (b) two (2) in-house counsel who are identified by the receiving party; (c) outside counsel for the receiving party; (d) supporting personnel employed by (b) and (c), such as paralegals, legal secretaries, data entry clerks, legal clerks, and private photocopying services; (e) experts or consultants; and (f) any persons requested by counsel to furnish services such as document coding, image scanning, mock trial, jury profiling, translation services, court reporting services, demonstrative exhibit preparation, or the creation of any computer database from documents.

9. Subject to paragraph 9 below, Confidential Attorney Eyes Only Information may be disclosed by the receiving party only to the following individuals, provided that such individuals are informed of the terms of this Protective Order: (a) outside counsel for the receiving party; (b) supporting personnel employed by outside counsel, such as paralegals, legal secretaries, data entry clerks, legal clerks, private photocopying services; (c) experts or consultants; and (d) those individuals designated in paragraph 11(c).

10. Further, prior to disclosing Confidential Information or Confidential Attorney Eyes Only Information to a receiving party's proposed expert, consultant, or employees, the receiving party must provide to the producing party a signed Confidentiality Agreement in the form

attached as Exhibit A, the resume or curriculum vitae of the proposed expert or consultant, the expert or consultant's business affiliation, and any current and past consulting relationships in the industry. The producing party will thereafter have ten (10) business days from receipt of the Confidentiality Agreement to object to any proposed individual. The objection must be made for good cause and in writing, stating with particularity the reasons for the objection. Failure to object within ten (10) business days constitutes a rebuttable presumption of approval. If the parties are unable to resolve any objection, the receiving party may apply to the presiding judge to resolve the matter. There will be no disclosure to any proposed individual during the ten (10) business day objection period, unless that period is waived by the producing party, or if any objection is made, until the parties have resolved the objection, or the presiding judge has ruled upon any resultant motion.

11. Counsel is responsible for the adherence by third-party vendors to the terms and conditions of this Protective Order. Counsel may fulfill this obligation by obtaining a signed Confidentiality Agreement in the form attached as Exhibit B.

12. Confidential Information or Confidential Attorney Eyes Only Information may be disclosed to a person who is not already allowed access to such information under this Protective Order if:

(a) the information was previously received or authored by the person or was authored or received by a director, officer, employee or agent of the company for which the person is testifying as a designee under Fed. R. Civ. P. 30(b)(6);

(b) the designating party is the person or is a party for whom the person is a director, officer, employee, consultant or agent; or

(c) counsel for the party designating the material agrees that the material may be disclosed to the person.

In the event of disclosure under this paragraph, only the reporter, the person, his or her counsel, the presiding judge, and persons to whom disclosure may be made and who are bound by this Protective Order, may be present during the disclosure or discussion of Confidential Information. Disclosure of material pursuant to this paragraph does not constitute a waiver of the confidential status of the material so disclosed.

Non-Party Information.

13. The existence of this Protective Order must be disclosed to any person producing documents, tangible things, or testimony in this action who may reasonably be expected to desire confidential treatment for such documents, tangible things or testimony. Any such person may designate documents, tangible things, or testimony confidential pursuant to this Protective Order.

Filing Documents With the Court.

14. If any party wishes to submit Confidential Information to the court, the submission must be filed only in a sealed envelope bearing the caption of this action and a notice in the following form:

CONFIDENTIAL INFORMATION

Lighting Ballast Control LLC,

v.

Advanced Transformer Co., Fulham, Co., Inc.,

General Electric Co., and Universal Lighting Technologies, Inc.

This envelope, which is being filed under seal,
contains documents that are subject to a Protective
Order governing the use of confidential discovery material.

No Prejudice.

15. Producing or receiving confidential information, or otherwise complying with the terms of this Protective Order, will not (a) operate as an admission by any party that any particular Confidential Information contains or reflects trade secrets or any other type of confidential or proprietary information; (b) prejudice the rights of a party to object to the production of information or material that the party does not consider to be within the scope of discovery; (c) prejudice the rights of a party to seek a determination by the presiding judge that particular materials be produced; (d) prejudice the rights of a party to apply to the presiding judge for further protective orders; or (e) prevent the parties from agreeing in writing to alter or

waive the provisions or protections provided for in this Protective Order with respect to any particular information or material.

Conclusion of Litigation.

16. Within sixty (60) calendar days after final judgment in this action, including the exhaustion of all appeals, or within sixty (60) calendar days after dismissal pursuant to a settlement agreement, each party or other person subject to the terms of this Protective Order is under an obligation to destroy or return to the producing party all materials and documents containing Confidential Information or Confidential Attorney Eyes Only Information, and to certify to the producing party that this destruction or return has been done. However, outside counsel for any party is entitled to retain all court papers, trial transcripts, exhibits, and attorney work provided that any such materials are maintained and protected in accordance with the terms of this Protective Order.

Other Proceedings.

17. By entering this Protective Order and limiting the disclosure of information in this case, the presiding judge does not intend to preclude another court from finding that information may be relevant and subject to disclosure in another case. Any person or party subject to this Protective Order who may be subject to a motion to disclose another party's information designated Confidential pursuant to this Protective Order must promptly notify that party of the motion so that the party may have an opportunity to appear and be heard on whether that information should be disclosed.

Remedies.

18. It is Ordered that this Protective Order will be enforced by the sanctions set forth in Fed. R. Civ. P. 37(b) and any other sanctions as may be available to the presiding judge, including the power to hold parties or other violators of this Protective Order in contempt. All

other remedies available to any person injured by a violation of this Protective Order are fully reserved.

19. Any party may petition the presiding judge for good cause shown if the party desires relief from a term or condition of this Protective Order.

SO ORDERED this 2nd day of February, 2010.


Reed O'Connor
UNITED STATES DISTRICT JUDGE

Exhibit A

**IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION**

LIGHTING BALLAST CONTROL LLC,)	
Plaintiff,)	
)	
v.)	
ADVANCE TRANSFORMER CO., FULHAM,)	C.A. No. 7:09-cv-00029-O
CO., INC., GENERAL)	
ELECTRIC COMPANY, and UNIVERSAL)	
LIGHTING TECHNOLOGIES, INC.,)	
)	
Defendants.)	
)	
)	

**CONFIDENTIALITY AGREEMENT FOR
EXPERT, CONSULTANT, OR EMPLOYEES OF ANY PARTY**

I hereby affirm that:

Information, including documents and things, designated as "Confidential Information," or "Confidential Attorney Eyes Only Information," as defined in the Protective Order entered in the above-captioned action ("Protective Order"), is being provided to me pursuant to the terms and restrictions of the Protective Order.

I have been given a copy of and have read the Protective Order.

I am familiar with the terms of the Protective Order and I agree to comply with and to be bound by its terms.

I submit to the jurisdiction of this Court for enforcement of the Protective Order.

I agree not to use any Confidential Information or Confidential Attorney Eyes Only Information disclosed to me pursuant to the Protective Order except for purposes of the above-captioned litigation and not to disclose any of this information to persons other than those specifically authorized by the Protective Order, without the express written consent of the party who designated the information as confidential or by order of the presiding judge. I also agree to notify any stenographic, clerical or technical personnel who are required to assist me of the terms of this Protective Order and of its binding effect on them and me.

I understand that I am to retain all documents or materials designated as or containing Confidential Information or Confidential Attorney Eyes Only Information in a secure manner, and that all such documents and materials are to remain in my personal custody until the completion of my assigned duties in this matter, whereupon all such documents and materials, including all copies thereof, and any writings prepared by me containing any Confidential Information or Confidential Attorney Eyes Only Information are to be returned to counsel who provided me with such documents and materials.

Executed on _____

[printed name]

[signature]

Exhibit B

**IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION**

LIGHTING BALLAST CONTROL LLC,)	
Plaintiff,)	
v.)	
ADVANCE TRANSFORMER CO., FULHAM,)	C.A. No. 7:09-cv-00029-O
CO., INC., GENERAL)	
ELECTRIC COMPANY, and UNIVERSAL)	
LIGHTING TECHNOLOGIES, INC.,)	
Defendants.)	
)	
)	

CONFIDENTIALITY AGREEMENT FOR THIRD-PARTY VENDORS

I hereby affirm that:

Information, including documents and things, designated as "Confidential Information," or "Confidential Attorney Eyes Only Information," as defined in the Protective Order entered in the above-captioned action ("Protective Order"), is being provided to me pursuant to the terms and restrictions of the Protective Order.

I have been given a copy of and have read the Protective Order.

I am familiar with the terms of the Protective Order and I agree to comply with and to be bound by its terms.

I submit to the jurisdiction of this Court for enforcement of the Protective Order.

I agree not to use any Confidential Information or Confidential Attorney Eyes Only Information disclosed to me pursuant to the Protective Order except for purposes of the above-captioned litigation and not to disclose any of this information to persons other than those specifically authorized by the Protective Order, without the express written consent of the party who designated the information as confidential or by order of the presiding judge.

Executed on _____

[printed name]

[signature]

COMPLAINT WITH JURY DEMAND AGAINST ALL DEFENDANTS FILED BY
LIGHTING BALLAST CONTROL LLC (DKT 1)

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION

LIGHTING BALLAST CONTROL LLC,	§	
	§	
Plaintiff,	§	
	§	
v.	§	CIVIL ACTION NO. _____
	§	
ADVANCE TRANSFORMER CO.,	§	JURY TRIAL DEMANDED
FULHAM CO., INC., GENERAL	§	
ELECTRIC COMPANY, and UNIVERSAL	§	
LIGHTING TECHNOLOGIES, INC.,	§	
	§	
Defendants.	§	

PLAINTIFF'S ORIGINAL COMPLAINT

Plaintiff LIGHTING BALLAST CONTROL LLC files this Original Complaint against Defendants ADVANCE TRANSFORMER CO., FULHAM CO., INC., GENERAL ELECTRIC COMPANY, and UNIVERSAL LIGHTING TECHNOLOGIES, INC., alleging as follows:

I. THE PARTIES

1. Plaintiff LIGHTING BALLAST CONTROL LLC ("LIGHTING BALLAST") is a limited liability company organized and existing under the laws of the State of Texas, with its principal place of business in Newport Beach, CA.

2. Upon information and belief, ADVANCE TRANSFORMER CO. ("ADVANCE"), a Division of Philips Electronics North America Corporation, is a corporation organized and existing under the laws of the State of Delaware, with a principal place of business in New York, New York. ADVANCE may be served with process through its registered agent Corporation Service Company, 701 Brazos Street, Suite 1050, Austin, TX 78701.

3. Upon information and belief, FULHAM CO., INC. ("FULHAM") is a corporation organized and existing under the laws of the State of California, with a principal place of

business in Hawthorne, California. FULHAM may be served with process through its registered agent Brian H. Wald, 12705 South Van Ness Avenue, Hawthorne, CA 90250.

4. Upon information and belief, GENERAL ELECTRIC COMPANY ("GE") is a corporation organized and existing under the laws of the State of New York, with a principal place of business in Fairfield, Connecticut. GE may be served with process through its registered agent CT Corporation System, 350 N. St. Paul Street, Dallas, TX 75201.

5. Upon information and belief, UNIVERSAL LIGHTING TECHNOLOGIES, INC. ("ULT") is a corporation organized and existing under the laws of the State of Delaware, with a principal place of business in Nashville, Tennessee. ULT may be served with process through its registered agent National Registered Agents, Inc., 16055 Space Center, Suite 235, Houston, TX 77062.

II. JURISDICTION AND VENUE

6. This is an action for infringement of a United States patent. This Court has exclusive jurisdiction of such action under Title 28 U.S.C. § 1338(a).

7. Upon information and belief, Defendants have had minimum contacts with the Northern District of Texas such that this venue is a fair and reasonable one. Defendants have committed such purposeful acts and/or transactions in Texas that it reasonably knew and expected that it could be haled into a court as a future consequence of such activity. Upon information and belief, Defendants have transacted and, at the time of the filing of this Complaint, are transacting business within the Wichita Falls Division of the Northern District of Texas. For these reasons, personal jurisdiction exists and venue is proper in this Court under 28 U.S.C. §§ 1391(b) and (c) and 28 U.S.C. § 1400(b).

III. PATENT INFRINGEMENT

8. On July 25, 1995, United States Patent No. 5,436,529 (“the ‘529 patent”) was duly and legally issued for a “Control and Protection Circuit for Electronic Ballast.” A true and correct copy of the ‘529 patent is attached hereto as Exhibit “A” and made a part hereof.

9. LIGHTING BALLAST is a licensee of the ‘529 patent with the exclusive right to enforce the patent against infringers and to sue for and collect damages for all relevant times, including the right to prosecute this action.

10. The ‘529 patent is referred to as “the patent-in-suit.”

11. Upon information and belief, Defendants manufacture, make, have made, use, practice, import, provide, supply, distribute, sell and/or offer for sale products and/or systems that infringe one or more claims in the ‘529 patent; and/or Defendants induce and/or contribute to the infringement of one or more of the claims in the ‘529 patent by others. Such conduct constitutes, at a minimum, patent infringement under 35 U.S.C. § 271.

12. Defendant ADVANCE infringes the ‘529 patent because it manufactures, makes, has made, uses, practices, imports, provides, supplies, distributes, sells and/or offers for sale electronic ballasts utilizing circuitry that monitors the voltage across one or more lamps and provides end-of-life protection for multiple types of failures. By way of example, the ADVANCE Centium ICN-2S54 ballast infringes one or more claims of the ‘529 patent.

13. Defendant FULHAM infringes the ‘529 patent because it manufactures, makes, has made, uses, practices, imports, provides, supplies, distributes, sells and/or offers for sale electronic ballasts utilizing circuitry that monitors the voltage across one or more lamps and provides end-of-life protection for multiple types of failures. By way of example, the FULHAM RH3-UNV-226-C ballast infringes one or more claims of the ‘529 patent.

14. Defendant GE infringes the '529 patent because it manufactures, makes, has made, uses, practices, imports, provides, supplies, distributes, sells and/or offers for sale electronic ballasts utilizing circuitry that monitors the voltage across one or more lamps and provides end-of-life protection for multiple types of failures. By way of example, the GEC226-MVPS-3W (Product Code: ;71445) ballast infringes one or more claims of the '529 patent.

15. Defendant ULT infringes the '529 patent because it manufactures, makes, has made, uses, practices, imports, provides, supplies, distributes, sells and/or offers for sale electronic ballasts utilizing circuitry that monitors the voltage across one or more lamps and provides end-of-life protection for multiple types of failures. By way of example, the ULT B254PUNV-D ballast infringes one or more claims of the '529 patent.

16. LIGHTING BALLAST has been damaged as a result of Defendants' infringing conduct. Defendants are, thus, liable to LIGHTING BALLAST in an amount that adequately compensates it for Defendants' infringement, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284.

17. Defendant ADVANCE was put on notice of the '529 patent and of its infringing conduct on or about September 14, 2005, if not earlier, and has knowingly and willfully infringed the '529 patent since the time it received such notice.

18. Defendant FULHAM was put on notice of the '529 patent and of its infringing conduct on or about March 23, 2006, if not earlier, and has knowingly and willfully infringed the '529 patent since the time it received such notice.

19. Defendant GE was put on notice of the '529 patent and of its infringing conduct on or about December 30, 2005, if not earlier, and has knowingly and willfully infringed the '529 patent since the time it received such notice.

20. Defendant ULT was put on notice of the '529 patent and of its infringing conduct on or about October 7, 2005, if not earlier, and has knowingly and willfully infringed the '529 patent since the time it received such notice.

21. Upon information and belief, Defendants will continue their infringement of the patents-in-suit unless enjoined by the Court. Defendants' infringing conduct causes Plaintiff irreparable harm and will continue to cause such harm without the issuance of an injunction.

IV. JURY DEMAND

LIGHTING BALLAST hereby requests a trial by jury pursuant to Rule 38 of the Federal Rules of Civil Procedure.

V. PRAYER FOR RELIEF

LIGHTING BALLAST requests that the Court find in its favor and against Defendants, and that the Court grant LIGHTING BALLAST the following relief:

- a. Judgment that one or more claims of United States Patent No. 5,436,529 have been infringed, either literally and/or under the doctrine of equivalents, by Defendants and/or by others to whose infringement Defendants have contributed and/or by others whose infringement has been induced by Defendants;
- b. Judgment that Defendants account for and pay to LIGHTING BALLAST all damages to and costs incurred by LIGHTING BALLAST because of Defendants' infringing activities and other conduct complained of herein;
- c. That Defendants' infringement be found to be willful from the time Defendants became aware of the infringing nature of its products, which is the time of filing of Plaintiff's Complaint at the latest, and that the Court award treble damages for the period of such willful infringement pursuant to 35 U.S.C. § 284.
- d. That LIGHTING BALLAST be granted pre-judgment and post-judgment interest on the damages caused to it by reason of Defendants' infringing activities and other conduct complained of herein;
- e. That this Court declare this an exceptional case and award LIGHTING BALLAST its reasonable attorney's fees and costs in accordance with 35 U.S.C. § 285;

Case 7:09-cv-00029-O Document 1 Filed 02/24/09 Page 6 of 6 PageID 6

- f. That Defendants be permanently enjoined from any further activity or conduct that infringes one or more claims of the patent-in-suit; and
- g. That LIGHTING BALLAST be granted such other and further relief as the Court may deem just and proper under the circumstances.

Dated: February 24, 2009.

Respectfully submitted,

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ATTORNEYS FOR PLAINTIFF

Case 7:09-cv-00029-O Document 1-2 Filed 02/24/09 Page 1 of 16 PageID 7

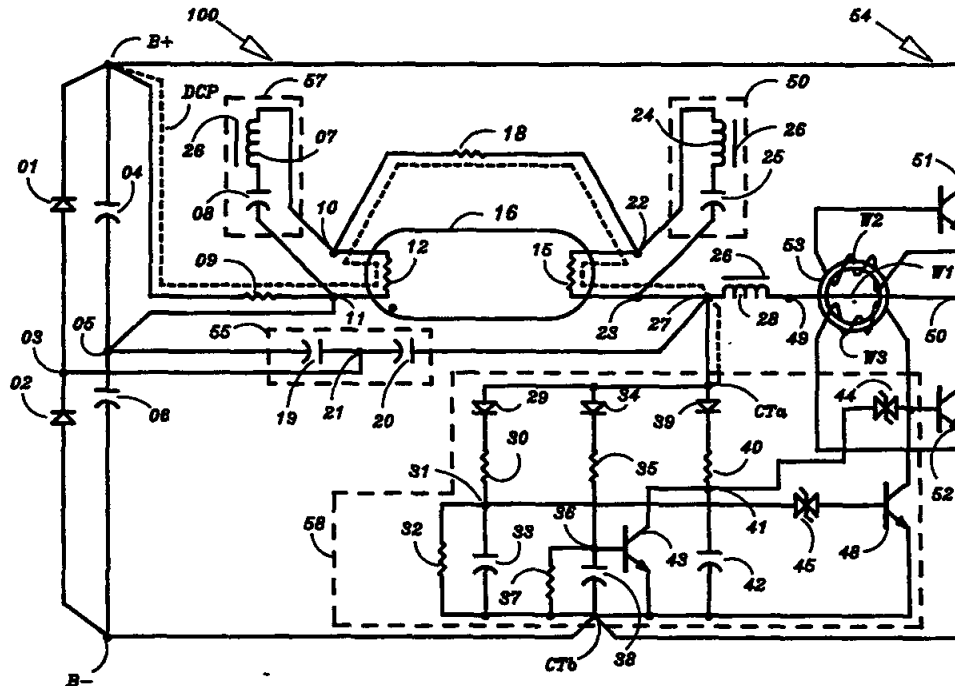
EXHIBIT “A”

Case 7:09-cv-00029-O Document 1-2 Filed 02/24/09 Page 2 of 16 Page ID #: 6

US005436529A

United States Patent [19][11] **Patent Number:** **5,436,529****Bobel**[45] **Date of Patent:** **Jul. 25, 1995**[54] **CONTROL AND PROTECTION CIRCUIT FOR ELECTRONIC BALLAST**5,004,955 4/1991 Nilssen 315/119
5,179,509 1/1993 Ling 363/17[76] **Inventor:** Andrzej A. Bobel, 201 Norman Ct.,
Des Plaines, Ill. 60016*Primary Examiner*—Benny Lee*Assistant Examiner*—Reginald A. Ratliff*Attorney, Agent, or Firm*—Hill, Steadman & Simpson[21] **Appl. No.:** 52,224[22] **Filed:** Apr. 22, 1993**Related U.S. Application Data**[63] Continuation-in-part of Ser. No. 11,971, Feb. 1, 1993,
abandoned.[51] **Int. Cl.⁶** H05B 37/02[52] **U.S. Cl.** 315/127; 315/122;
315/125; 315/119; 315/106; 315/107[58] **Field of Search** 315/127, 119, 122, 125,
315/106, 107, 360[56] **References Cited****U.S. PATENT DOCUMENTS**3,084,294 4/1964 Grunwaldt .
4,461,980 7/1984 Nilssen .
4,616,158 10/1986 Krummel et al. .
4,710,682 3/1987 Zuchtriegel 315/224[57] **ABSTRACT**

A series-resonant ballast for powering at least one gas discharge lamp (16) having heatable filaments (12,15) includes: DC voltage input terminals (B+,B-); an oscillating resonant converter (55,26,51,52,53) for producing high frequency voltage for application to the gas discharge lamp; a control circuit (58) able to receive a control signal from the DC input terminals and from the resonant converter and operable to initiate and stop the oscillations; and direct current blocking circuits (57,50) coupled across the filaments (12,15) and operable to stop flow of the control signal from the DC input terminals, thereby the ballast will not oscillate and will not draw any power from the DC input terminals, whenever the gas discharge lamp is: (i) removed from the output terminals, (ii) is defective, or (iv) is inoperative.

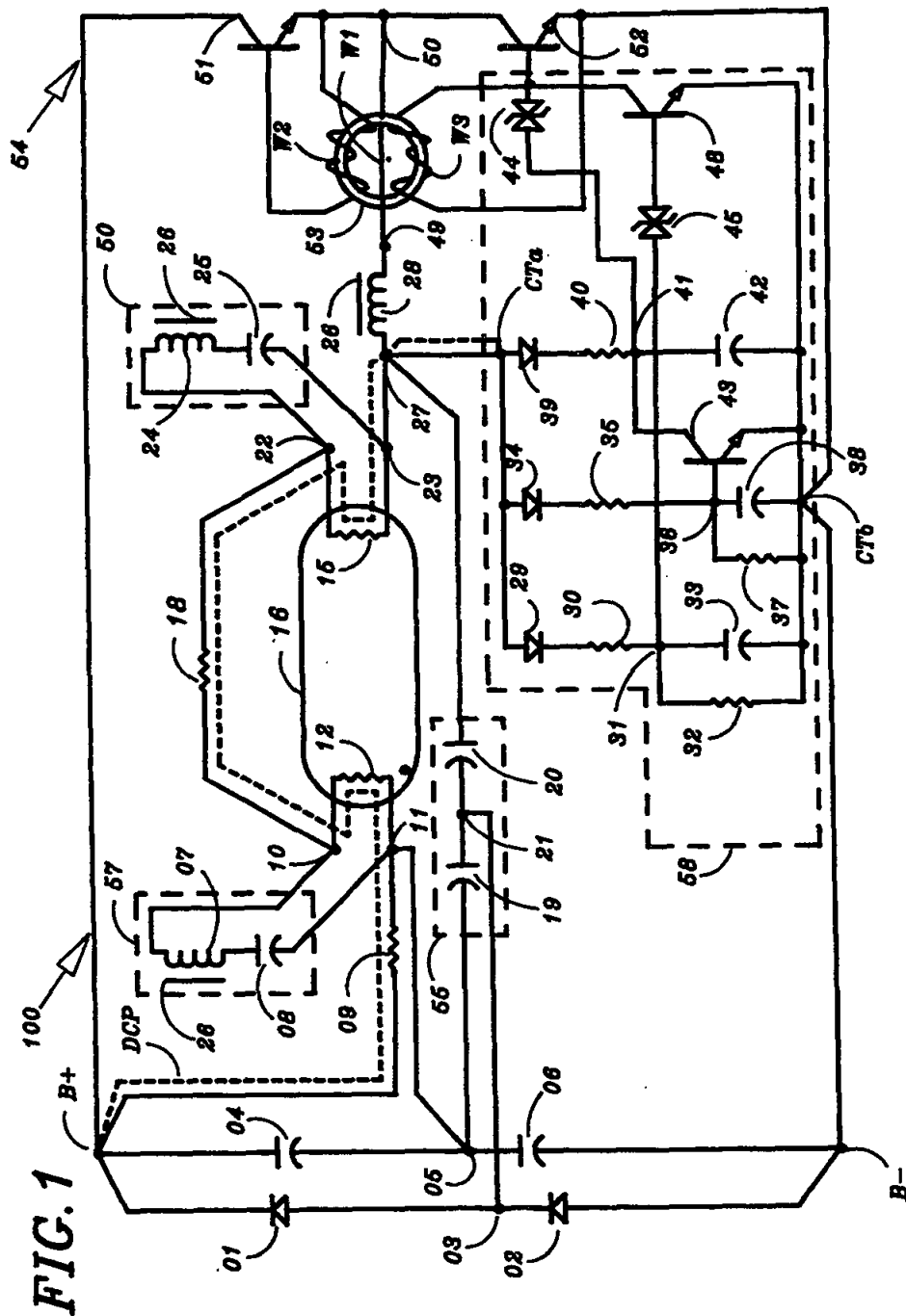
18 Claims, 7 Drawing Sheets

U.S. Patent

July 25, 1995

Sheet 1 of 7

5,436,529

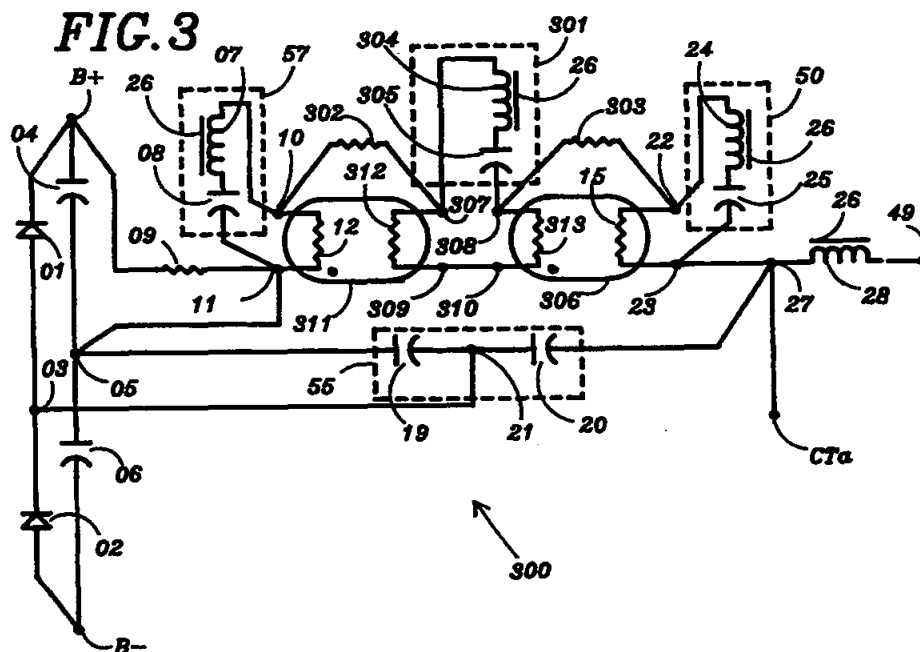
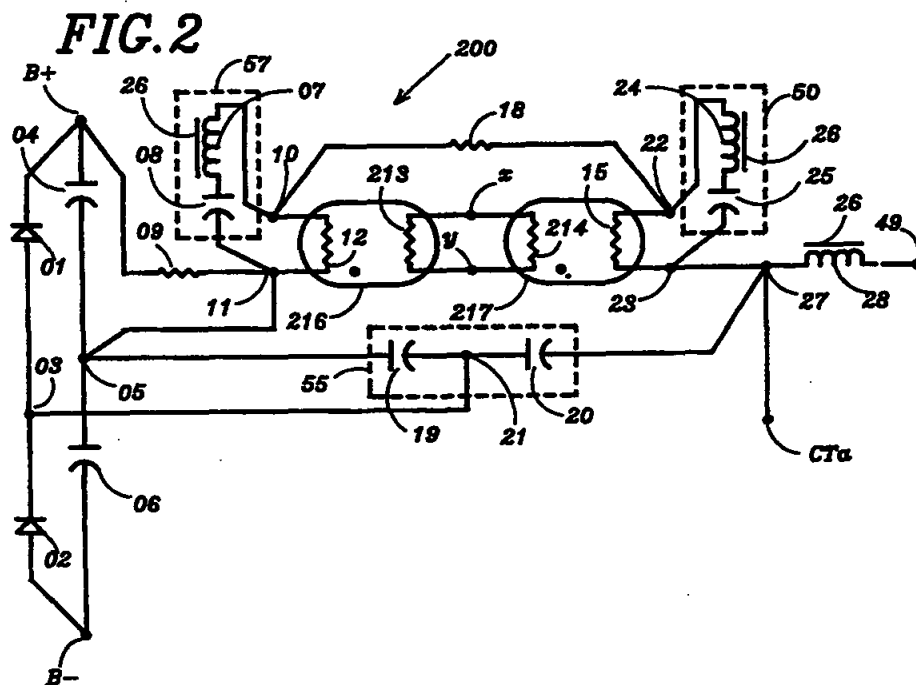


U.S. Patent

July 25, 1995

Sheet 2 of 7

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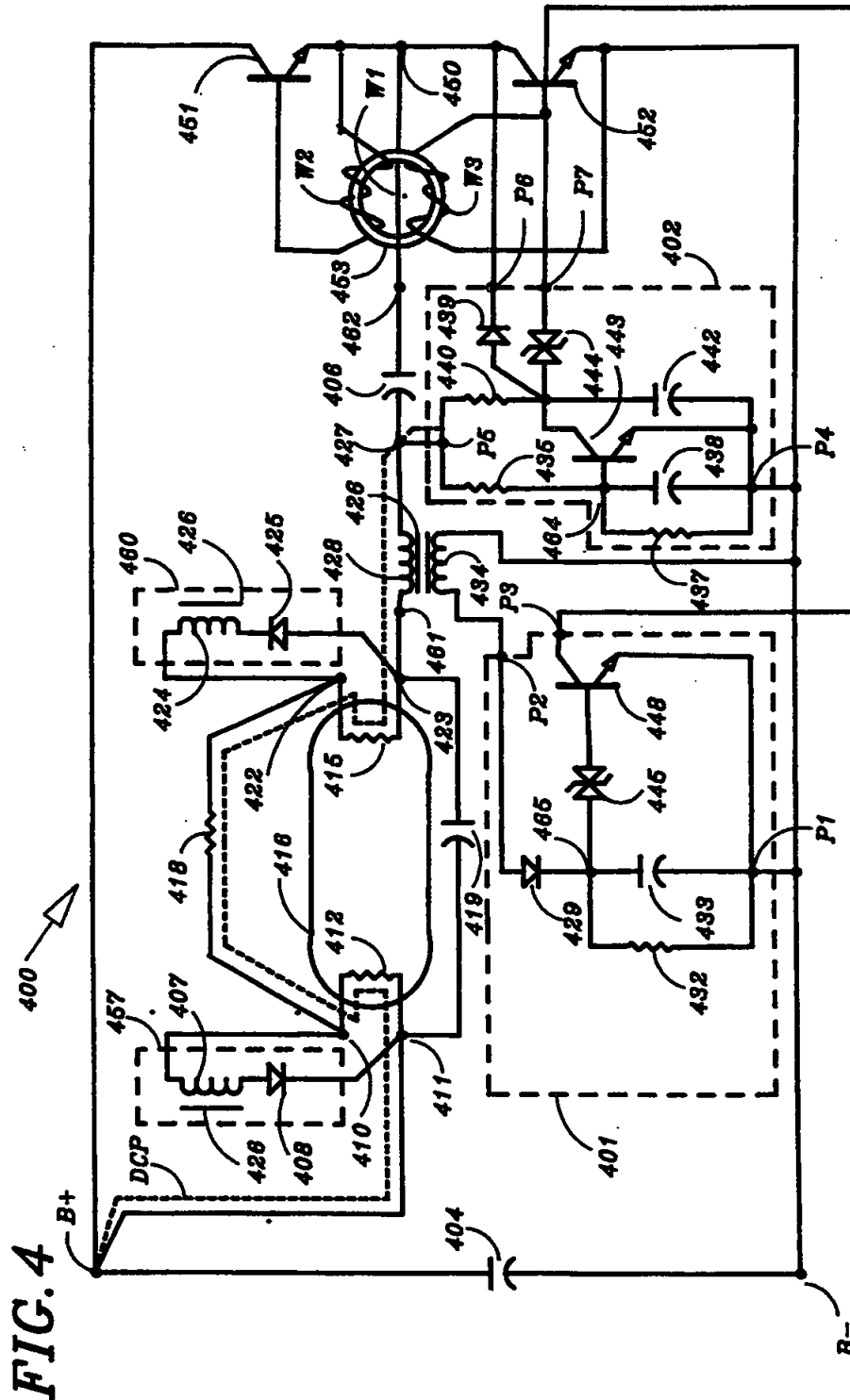


U.S. Patent

July 25, 1995

Sheet 3 of 7

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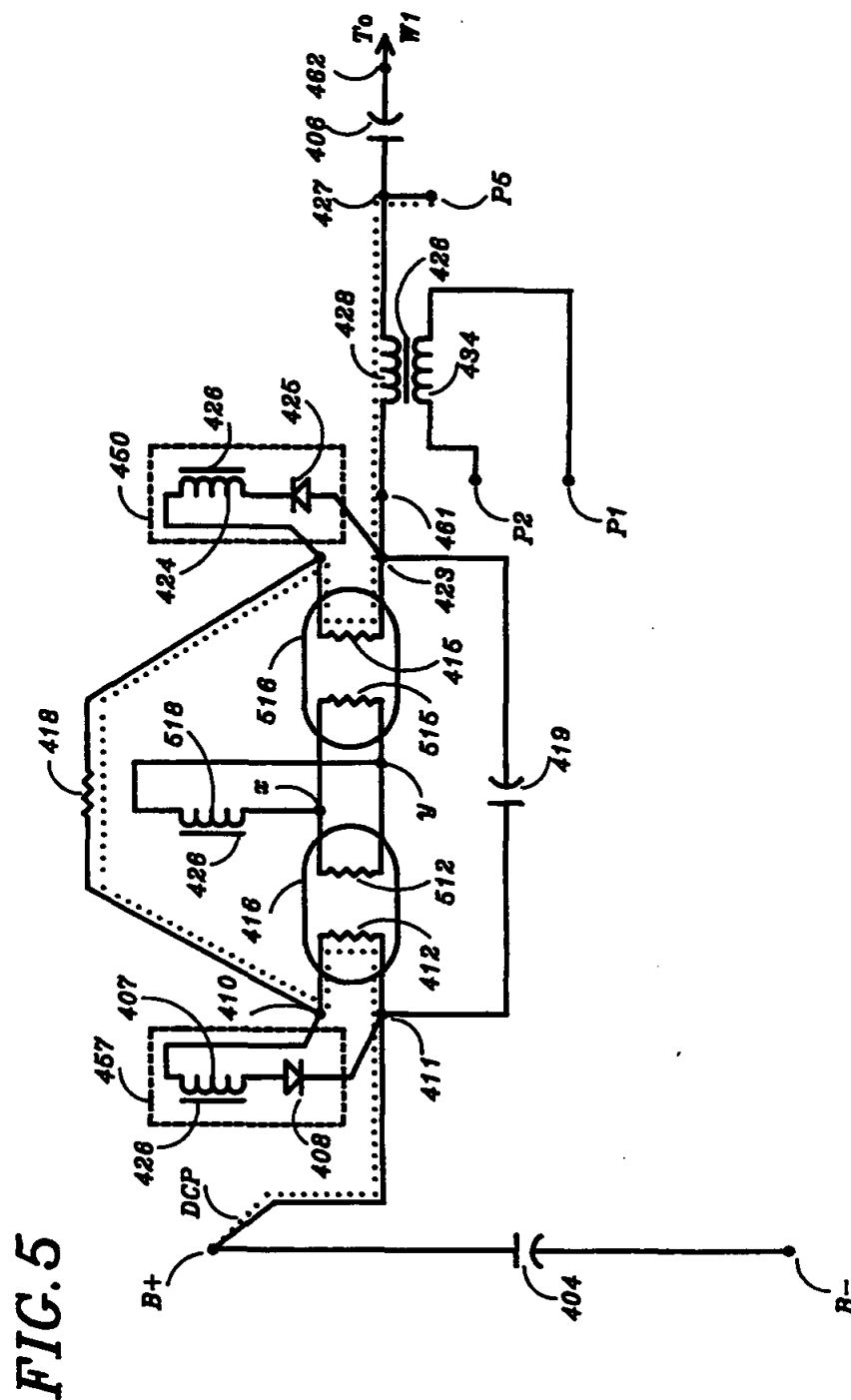


U.S. Patent

July 25, 1995

Sheet 4 of 7

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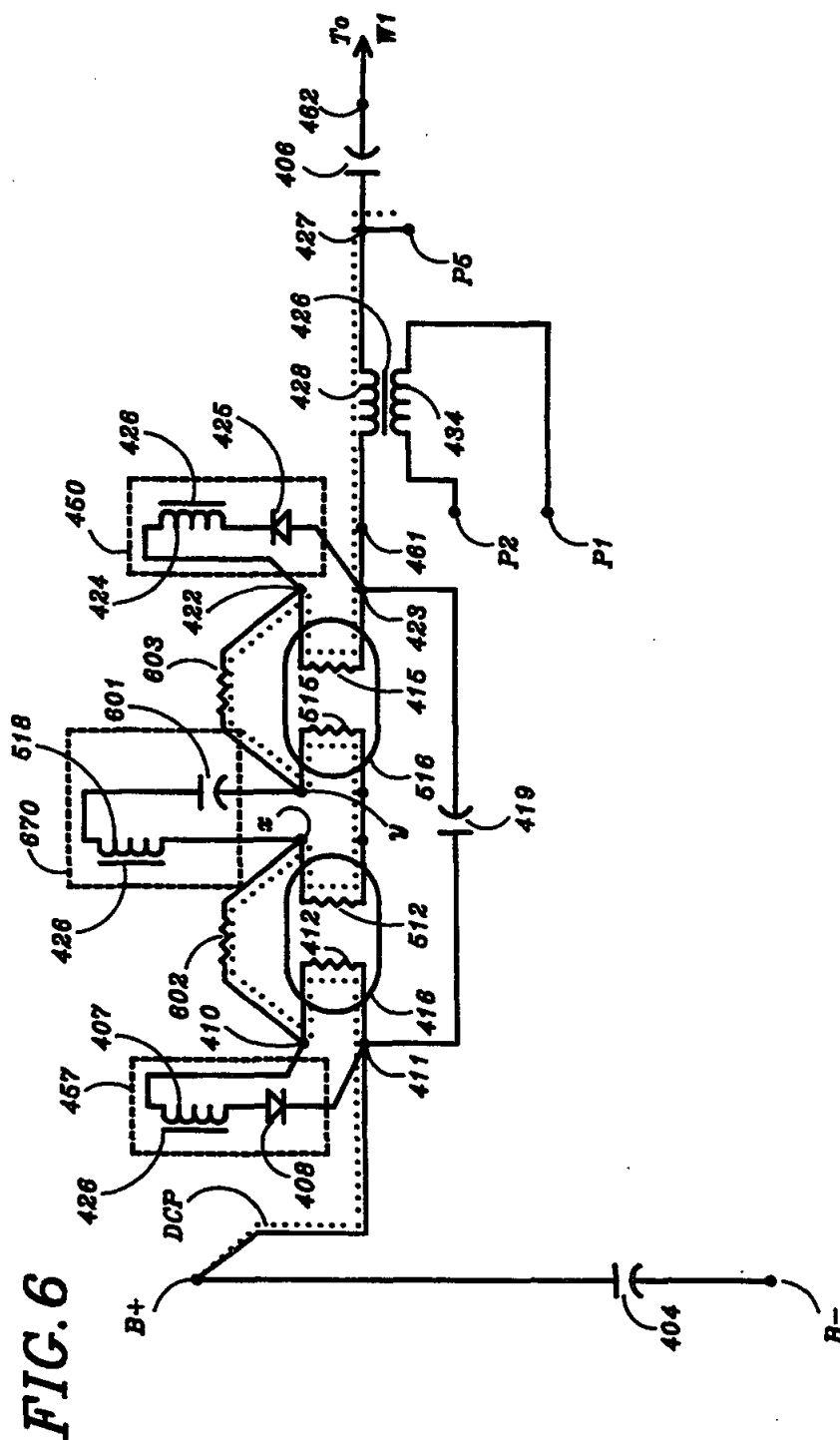
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July 25, 1995

Sheet 5 of 7

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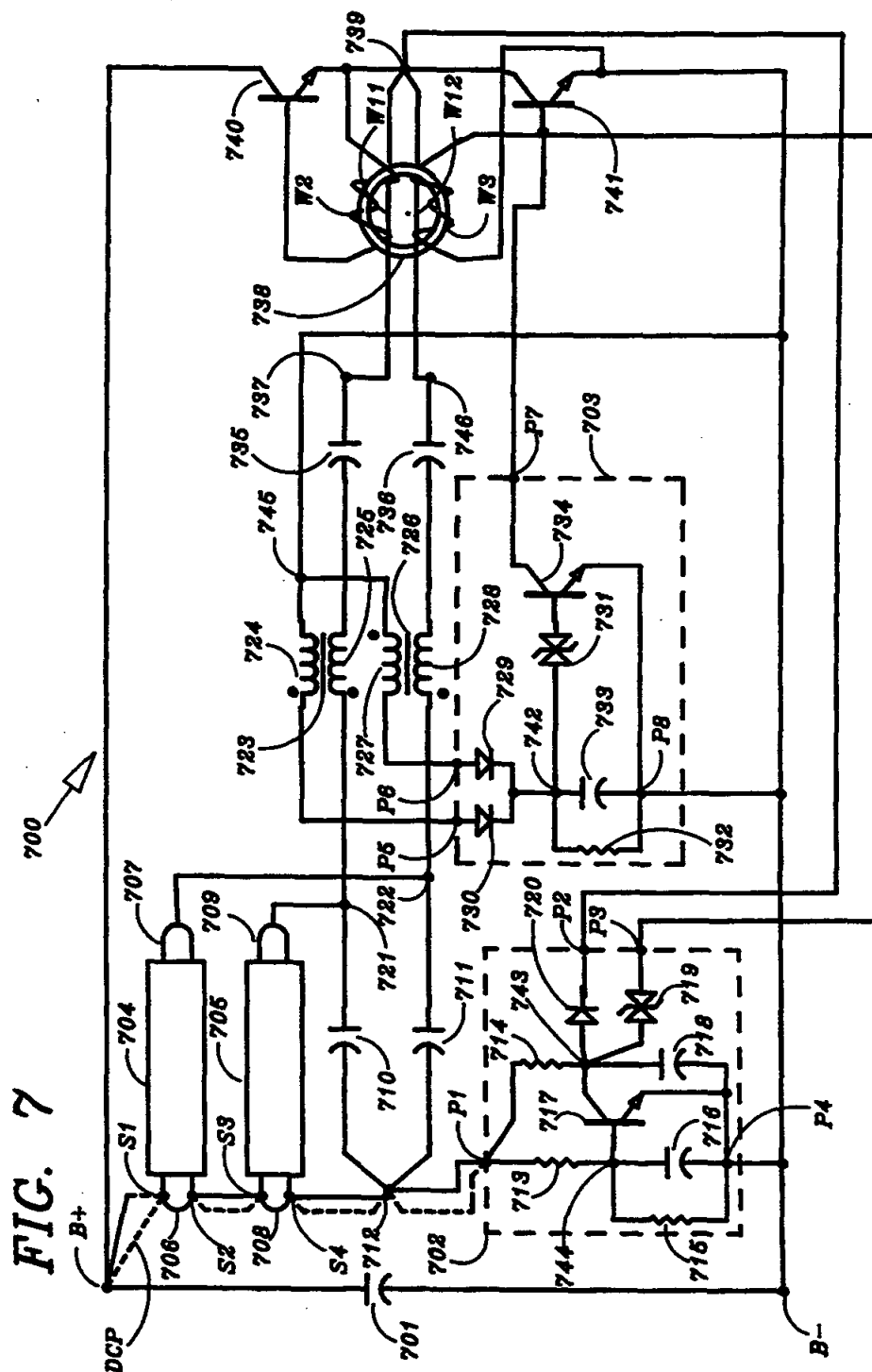


U.S. Patent

July 25, 1995

Sheet 6 of 7

5,436,529



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U.S. Patent

July 25, 1995

Sheet 7 of 7

5,436,529

FIG. 8

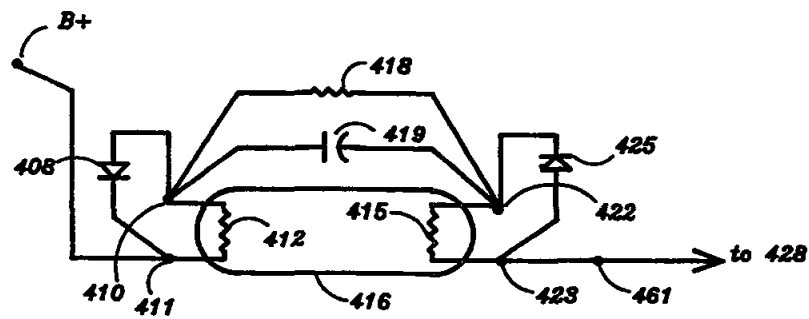
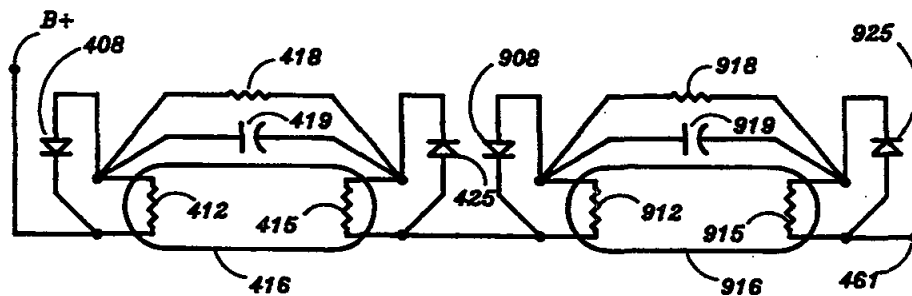


FIG. 9



1

CONTROL AND PROTECTION CIRCUIT FOR ELECTRONIC BALLAST

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of an earlier U.S. patent application Ser. No. 08/011,971 filed Feb. 1, 1993 now abandoned.

BACKGROUND OF THE INVENTION

It is common knowledge that application of a series-resonant inverter to power a gas discharge load is particularly ideal in regards to the inverter's matching properties with those of the gas discharge load. Especially, the properties like starting requirements and requirement of the waveform shape of the current supplied to the lamp load, are particularly favorable in respect to life duration of the lamp. (As described in U.S. Pat. No. 3,084,283 to Grunwaldt).

It is also known that in a series-resonant LC inverter, where the lamp load is connected across the resonant capacitor C, it is necessary to provide some means to protect the inverter from self-destruction, whenever the lamp fails to ignite or is removed out of its holders.

Furthermore, as is with all gas discharge lamp ballasts, the voltages required at the lampholders to start the lamps are so high as to potentially constitute a substantial electric shock hazard to persons having to service such ballasts.

To eliminate this hazard, whenever lampholders voltages exceed certain levels, protective measures have to be provided and shall be integrated in the ballast circuit design.

In the paper presented by McMurray, Shattuck: "Silicon-Controlled Inverter with Improved Commutation" at the AIEE Summer General Meeting, Ithaca, N.Y., Jun. 18-23, 1961, the authors described protection circuit for the series-resonant inverter with use of so called "feedback rectifiers" to return energy to a DC source. The most important drawback is that the inverter has large magnitude of current circulated within itself, thereby causing large power dissipation.

It will be most desirable to have a series-resonant inverter ballast circuit which (i) will not dissipate any power within itself when unloaded, and (ii) do not constitute a shock hazard to humans.

The circuits for protection of the series-resonant inverters have been described previously, notably in the following issued U.S. patents: U.S. Pat. No. 4,461,980 to Nilssen and U.S. Pat. No. 4,616,158 to Krummel et al.

In the Nilssen circuit, the ballast inverter is disabled within about one second after a lamp is removed from its lampholders, and the ballast is not taking any power, even though the power line voltage is applied. Whenever a new lamp is re-inserted, the power line voltage must be turned OFF and ON before the ballast will start the new lamp. It is a significant drawback and has not been accepted in the marketplace.

In the Krummel et al. circuit, the shut-off device provides for inverter shut-down in all abnormal load conditions. It also provides for strike of a new lamp after relamping without turning the power line voltage OFF and ON. After construction of the device for a power line voltage of 120 VAC, it has been discovered that the inverter's circulating current is of a large magnitude. The circulating current flows through the lamp filaments and filaments voltages are proportional to that

5,436,529

2

current and are also very high. This drawback is significant and limits the invention's scope of applications.

Based on the background outlined above, it is highly desirable to have a series-resonant ballast for gas discharge lamps, which: (a) will not draw power from a power line source whenever lamps are removed or inoperative; (b) will strike new lamps after relamping without turning power line voltage OFF and ON; (c) can be adapted to any lamp type and power line voltage magnitude; (d) will be very simple and easily manufacturable with high repeatability; and (e) will be inexpensive.

SUMMARY OF THE INVENTION

In accordance with the invention, there is provided an energy conversion device employing an oscillating resonant converter, having DC input terminals and adapted for powering at least one gas discharge lamp having heatable filaments, and comprising:

voltage source means able to provide constant or variable magnitude of a DC voltage between the DC input terminals;

output terminals for connection to the filaments of the gas discharge lamp;

one-shot trigger means coupled to the DC input terminals and to the resonant converter, and (i) able to receive a trigger control signal from the DC input terminals, and (ii) operable to provide one trigger pulse to effectively initiate the oscillations;

one-shot disable means coupled to the DC input terminals and to the resonant converter, and (i) able to receive a disable control signal from the resonant converter, and (ii) operable to provide one disable pulse to effectively disable the oscillations; and direct current blocking means coupled to the output terminals and operable to stop flow of the trigger control signal from the DC input terminals.

It will be understood that such a device as outlined above will provide a series-resonant ballast for gas discharge lamps. The ballast will not draw any power from a power line source whenever lamps are removed or inoperative and will ignite new lamps after relamping, without turning power line voltage OFF and ON. The circuit of the device is simple, inexpensive, and can be adapted to any lamp type and power line voltage magnitude.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 schematically illustrates the invention in its first embodiment;

FIG. 2 is a fragmentary illustration of an alternative version of the device of FIG. 1;

FIG. 3 is another fragmentary illustration of alternative version of the device of FIG. 1;

FIG. 4 schematically illustrates the invention in its second embodiment;

FIG. 5 is a fragmentary illustration of an alternative version of the device of FIG. 4;

FIG. 6 is another fragmentary illustration of an alternative version of the device of FIG. 4;

FIG. 7 schematically illustrates the invention in its third embodiment;

FIG. 8 is an alternative version of the device of FIG. 4; and

FIG. 9 is also an alternative version of the device of FIG. 4.

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5,436,529

4

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. 1, a circuit 100, for powering a fluorescent lamp 16, has two DC input terminals B+, B- for receiving thereacross a DC supply voltage of approximately 250 Volts. Two capacitors 04,06 (having equal values of approximately 47 uF) are connected in series between the DC input terminals B+, B- via a node 05.

A half-bridge inverter 54 has a bipolar transistor 51 (of the type MJE 13005) connected at its collector electrode to the positive DC input terminal B+. The transistor 51 has its emitter electrode connected to a node 50. A further transistor 52 (like the transistor 51, of the type MJE 13005) of the inverter 54 has its collector electrode connected to the node 50. The transistor 52 has its emitter electrode connected to the negative DC input terminal B-. A series-resonant circuit has a resonant capacitance 55 and a primary winding 28 of a resonant inductor 26 connected in series between the node 05 and a node 49 via an intermediate terminal 27.

A saturable feedback transformer 53 has a primary winding W1 (having one turn) and two secondary windings W2, W3 (each having approximately three turns) wound on a toroidal core. The primary winding W1 is connected in series with the primary winding 28 of the inductor 26, between the node 50 and the node 49. The secondary winding W2 is connected between a base electrode and the emitter electrode of the transistor 51. The secondary winding W3 is connected (with opposite polarity with respect to the secondary winding W2) between a base electrode and the emitter electrode of the transistor 52.

The resonant inductor 26 has secondary windings 07,24 magnetically coupled to the primary winding 28 and has an inductance value of the primary winding 28 equal to approximately 1.75 mH.

The resonant capacitance 55 consists of two series-connected capacitors 19,20 (having values of 47 nF and 18 nF respectively) via a node 21.

A diode 01 has its cathode connected to the terminal B+ and has its anode connected to the node 21. A further diode 02 has its cathode connected to the node 21 and has its anode connected to the terminal B-.

The fluorescent lamp 16 (as an ordinary rapid start lamp) has two heatable filaments 12,13 and two pairs of connecting terminals 10,11 and 22,23, respectively. The terminal 11 is connected to the node 05, and the terminal 23 is connected to the intermediate terminal 27.

A resistor 18 is connected between terminals 10 and 22.

A DC blocking circuit 57 has a series connected secondary winding 07 with a capacitor 08, and is connected across terminals 10,11 of the lamp 18.

A further DC blocking circuit 50 has a series connected secondary winding 24 with a capacitor 25, and is connected across terminals 22,23 of the lamp 18.

A control circuit 58 has three control terminals CTa, CTb and CTc. The terminal CTa is connected to the intermediate terminal 27; the terminal CTb is connected to the terminal B-; and the terminal CTc is connected to the base electrode of the transistor 52.

The control circuit 58 has a first series current path between terminals CTa, CTb, and the path has a diode 39, a resistor 40, and a capacitor 42 connected in series, via a node 41 formed between the resistor 40 and the capacitor 42. A diac 44 is connected between the node

41 and the terminal CTc. A small signal npn transistor 43 is connected with its collector electrode to the node 41, and with its emitter electrode to the terminal CTb.

The control circuit 58 has a second series current path between terminals CTa, CTb, and the path has a diode 34, a resistor 35, and a capacitor 38 connected in series via a node 36 formed between the resistor 35 and the capacitor 38. The transistor 43 has its base electrode connected to the node 36. A resistor 37 is connected between the node 36 and the terminal CTb.

The control circuit 58 has a third series current path between terminals CTa, CTb, and the path has a diode 29, a resistor 30, and a capacitor 33 connected in series via a node 31 formed between the resistor 30 and the capacitor 33. A resistor 32 is connected to the node 31 and to the terminal CTb.

A small signal npn transistor 48 has its collector electrode connected to the terminal CTc and its emitter electrode connected to the terminal CTb. A diac 45 is connected between the node 31 and a base electrode of the transistor 48.

Referring now to FIG. 2, a circuit 200 is a fragmentary illustration of the variation of FIG. 1. The fluorescent lamp 16 of the circuit 100 illustrated in FIG. 1, is replaced with two lamps 216,217 connected in series. Two additional terminals x,y are formed between these two lamps, due to parallel connection of two additional filaments 213,214, which are associated with these lamps.

Referring now to FIG. 3, a circuit 300 is another alternative variation illustrated in circuit 100 of the FIG. 1. The fluorescent lamp 16 of FIG. 1 is replaced with two lamps 311,306. The lamp 311 has its two filaments 12,312 and two pairs of terminals 10,11 and 307,309 associated with the filaments, respectively. The lamp 306 has its two filaments 313,15 and two pairs of terminals 308,310 and 22,23 associated with the filaments respectively. The filaments 312 and 313 are connected in series by connecting the terminal 309 to terminal 310.

A DC blocking circuit 301 has a secondary winding 304 of the inductor 26 connected in series with a capacitor 307. The circuit 301 is connected between terminals 307,308.

A resistor 302 is connected between terminals 10,307, and another resistor 303 is connected between terminals 308,22.

The capacitor 08 of FIG. 1 can be replaced with a semiconductor diode having its cathode connected to terminal 1. Also, the capacitor 25 of FIG. 1 can be replaced with a semiconductor diode, having its anode connected to terminal 23.

Referring now to FIG. 4, a circuit 400, for powering a fluorescent lamp 416, has two DC input terminals B+, B- for receiving thereacross a DC supply voltage.

A capacitor 404, (having value of approximately 47 uF) is connected between the DC input terminals B+, B-.

A half bridge inverter 454 has a bipolar transistor 451 connected at its collector electrode to the positive DC input terminal B+. The transistor 451 has its emitter electrode connected to a node 450. A further transistor 452 of the inverter 454 has its collector electrode connected to the node 450. The transistor 452 has its emitter electrode connected to the negative DC input terminal B-.

A series-resonant circuit has a resonant capacitance 419, a primary winding 428 of a resonant inductor 426,

5,436,529

5

and a ballasting capacitor 406. All are connected in a series circuit between terminal B+ and the node 450 via intermediate terminals 461, 427, and 462, respectively.

A saturable feedback transformer made with a toroidal core 453 has a primary winding W1 (having one turn) connected in circuit with the primary winding 428, and has two secondary windings W2, W3 connected respectively to base-emitter junctions of the transistors 451 and 452.

The resonant inductor 426 has filament heating secondary windings 407, 424, and a disable sensing secondary winding 434 magnetically coupled with the primary winding 428.

The fluorescent lamp 416 (as an ordinary rapid start lamp) has two heatable filaments 412, 415 and two pairs of connecting terminals 410, 411 and 422, 423, respectively. The terminal 411 is connected to the terminal B+, and the terminal 423 is connected to the intermediate terminal 461.

A DC current blocking circuit 457 has a series connected secondary winding 407 with a diode 408 and is connected across terminals 410, 411 of the lamp 416.

A further DC current blocking circuit 460 has a series connected secondary winding 424 with a diode 425 and is connected across terminals 422, 423 of the lamp 416.

A one-shot trigger circuit 402 has four pin-terminals P4, P5, P6 and P7. The pin-terminal P4 is connected to the terminal B-, the pin-terminal P5 is connected to the intermediate terminal 427 (and equivalently to the terminal 462 or terminal 461), the pin-terminal P6 is connected to the node 450, and the pin-terminal P7 is connected to a base electrode of the transistor 452.

The one-shot trigger circuit 402 has a first current path between pin-terminals P5 and P4, and the path has a resistor 440 and a capacitor 442 connected in series via a node 463. A diac 444 is connected between the node 463 and the pin-terminal P7. A small signal npn transistor 443 is connected with its collector electrode to the node 463, and with its emitter electrode to the pin-terminal P4. A diode 439 is connected between the node 463 and the pin-terminal P6.

The one-shot trigger circuit 402 has a second current path between pin-terminals P5 and P4, and the path has a resistor 435 and a capacitor 438 connected in series via a node 464. A resistor 437 is connected between the node 464 and the pin-terminal P4. Also, the small signal transistor 443 has its base electrode connected to the node 464.

A one-shot disable circuit 410 has an input pin-terminal P2, has an output pin-terminal P3, and has a ground pin-terminal P1. The disable sensing secondary winding 434 of the resonant inductor 426, is connected across pin-terminals P2 and P1. The output pin-terminal P3 is connected to a base electrode of the inverter transistor 452.

The one-shot disable circuit 401 has an input current path between pin-terminals P2 and P1, and the path has a diode 429 and a capacitor 433 connected in series via a node 465. A resistor 432 is connected between the node 465 and the pin-terminal P1. An output transistor 448 has its collector electrode connected to the pin-terminal P3, and has its emitter electrode connected to the ground pin-terminal P1. A diac 445 is connected between the node 465 and a base electrode of the transistor 448.

Referring now to FIG. 5, a circuit 500 is a fragmentary illustration illustrated in variation of circuit 400 of the FIG. 4. An additional lamp 516 is connected in

6

series with lamp 416. Two additional terminals x,y are formed between these two lamps, due to parallel connection of two additional filaments 512, 515, which are associated with these lamps. Also, an additional filament heating winding 518 is connected across the terminals x,y. The winding 518 is magnetically coupled with the resonant inductor 426.

Referring now to FIG. 6, a circuit 600 is a fragmentary illustration of circuit 500 illustrated in FIG. 5. The lamp 516 is connected in series with the lamp 416. Two additional terminals x,y are formed between these two lamps due to series connection of two additional filaments 512, 515 which are associated with these lamps.

A DC current blocking circuit 670 as a the secondary winding 518 connected in series with a capacitor 601. The circuit 670 is connected between terminals x and y. A resistor 602 is connected between terminals 410 and x. A resistor 603 is connected between terminals y and 422.

Referring now to FIG. 7, a circuit 700 for powering two fluorescent lamps 704, 705 has two DC input terminals B+, B- for receiving thereacross a DC supply voltage.

A capacitor 701 is connected between terminals B+, B-.

A half bridge inverter 750 has a bipolar transistor 740 connected at its collector electrode to the positive DC input terminal B+. The transistor 740 has its emitter electrode connected to a node 739. A further transistor 741 of the inverter 750 has its collector electrode connected to the node 739. The transistor 741 has its emitter electrode connected to the negative DC input terminal B-.

The fluorescent lamps 704 and 705 (as ordinary instant start type) have their ends equipped with conductive pin-type terminals 706, 707 and 708, 709, respectively. The terminals 706 and 708 are placed in circuit interrupting lampholders and contact terminals S1, S2 and S3, S4 associated with them respectively. A connection is provided between terminal B+ and an intermediate terminal 712 via: contact S1, pin-type terminal 706, contact S2, contact S3, pin-type terminal 708, and contact S4.

A first series-resonant circuit is connected between the intermediate terminal 712 and the node 739 and comprising serially connected: a capacitor 710, a primary winding 725 of the inductor 723, a capacitor 735, and a primary winding W11 associated with a feedback transformer 738.

A second series-resonant circuit is connected between the intermediate terminal 712 and the node 739 and comprising serially connected: a capacitor 711, a primary winding 728 of the inductor 726, a capacitor 736, and a primary winding W12 associated with the feedback transformer 738.

The terminal 707 of the lamp 704 is connected to intermediate node 721 formed between the capacitor 710 and the winding 725.

The terminal 709 of the lamp 705 is connected to intermediate node 722 formed between the capacitor 711 and the primary winding 728.

The feedback transformer 738 has secondary windings W2 and W3 connected to base-emitter junctions of the transistors 740 and 741, respectively.

A one-shot trigger circuit 702 has four pin-terminals P1, P2, P3 and P4. The pin-terminal P4 is connected to the terminal B-, the pin-terminal P1 is connected to the intermediate terminal 712, the pin-terminal P2 is

5,436,529

7

connected to the intermediate node 739, and the pin-terminal P3 is connected to a base electrode of the transistor 741.

The one-shot trigger circuit 702 has a first current path between pin-terminals P1 and P4, and the path has a resistor 714 and a capacitor 718 connected in series via a node 743. A diac 719 is connected between the node 743 and the pin-terminal P3. A small signal npn transistor 717 is connected with its collector electrode to the node 743, and with its emitter electrode to the pin-terminal P4. A diode 720 is connected between the node 743 and the pin-terminal P2.

The one-shot trigger circuit 702 has a second current path between pin-terminals P1 and P4, and the path has a resistor 713 and a capacitor 716 connected in series via a node 744. A resistor 715 is connected between the node 744 and the pin-terminal P4. Also, the small signal transistor 717 has its base electrode connected to the node 744.

A one-shot disable circuit 703 has two input pin-terminals P5, P6, has an output pin-terminal P7, and has a ground pin-terminal P8. The resonant inductors 723, 726 are equipped with disable sensing secondary windings 724, 727, respectively. The windings 724 and 727 are polarized and connected in series (adding) mode via a node 745. The node 745 is connected to the ground pin-terminal P8. The windings 724 and 727 are connected to the input pin-terminals P5, P6, respectively. The output pin-terminal P7 is connected to a base electrode of the inverter transistor 741.

The one-shot disable circuit 703 has a first input current path between pin-terminals P5 and P8, and the path has a diode 730 and a capacitor 733 connected in series via a node 742. A resistor 732 is connected between the node 742 and the pin-terminal P8. The one-shot disable circuit 703 has a second current path between the pin-terminals P6 and P8, and the path has a diode 729 and the capacitor 733 connected in series via the node 742. An output transistor 734 has its collector electrode connected to the pin-terminal P7, and has its emitter electrode connected to the ground pin-terminal P8. A diac 731 is connected between node 742 and a base electrode of the transistor 734.

DETAILS OF OPERATION

Device of FIG. 1

Mode A

The device receives a DC voltage at the DC input terminals B+, B- and the capacitors 04, 06 are charged to a magnitude approximately equal to one-half of the DC voltage. Then, DC current starts to flow in the direct current path DCP from terminal B+ through: resistor 09, filament 12, resistor 18, filament 15, diode 39, resistor 40 to charge the capacitor 42 within the time period of T1 associated with values of the resistors and the capacitor. Whenever the voltage across the capacitor 42 will reach a level above breakover voltage of the diac 44, the diac turns ON the transistor 52. An alternating current will start to flow in the resonant circuit which includes the resonant inductor 26 and the resonant capacitance 55. With a feedback signal provided by the saturable feedback transformer 53, the device will start to oscillate. The filaments 12 and 15 are heated by current flow resulting from application of voltages by the windings 07 and 24, respectively. A relatively high voltage is developed across both resonant elements. Whenever a magnitude of peak voltage between the nodes 21 and 05 reaches a level of the DC voltage

8

present across the capacitor 04 or 06, the voltage applied to fluorescent lamp will be proportional to that voltage and is predetermined by a ratio of the values of the capacitors 19 and 20. The voltage applied to the lamp 16 causes the lamp to strike, and voltages across both resonant elements become lower accordingly. During the time period T1, a DC current will flow in another DC current path from terminal B+ through: resistor 09, filament 12, resistor 18, filament 15, diode 34, resistor 35 to charge capacitor 38 within a time period T2 dependent on values of the resistors in the path, value of the resistor 37, and value of the capacitor 38. When the voltage across the capacitor reaches a level sufficient enough to turn ON the transistor 43, the capacitor 42 will be held discharged for any time period as long as: (i) there is an unbroken direct current path DCP between terminal B+ and terminal CTa; (ii) the device oscillates and charging currents to the capacitors 42 and 38 are provided by an AC voltage potential associated with the intermediate terminal 27 in reference to terminal B-.

Mode B

While the device is operational as in Mode A, if the fluorescent lamp 16 is removed out of its holders, the AC voltage potential associated with the intermediate terminal 27 will rise, as this is natural behavior of the series-resonant circuit. A current will flow in the third series path of the control circuit 58 from terminal CTa through: diode 29, resistor 30, resistor 32 to charge capacitor 33 to a voltage level predetermined by values of the resistors in a predetermined time period associated with value of the capacitor 33. When the voltage across the capacitor 33 is greater than breakover voltage of the diac 45, the diac turns ON the transistor 48 for a brief period. As a result, the transistor 48 turns OFF the device and oscillations cease. The direct current path DCP between terminal B+ and terminal CTa is broken due to missing filaments 12, 15 of the lamp 16. The DC current will not flow through DC blocking circuits 57, 50, and the starting capacitor 42 will not be charged. Thus, the device will never start to oscillate on its own.

Mode C

The fluorescent lamp 16 is now re-inserted into its holders, that will complete the direct current path DCP between terminal B+ and terminal CTa, and the device will start as in Mode A above.

The above modes of operation all apply to the circuit of FIG. 2 as the alternative version of the circuit of FIG. 1. The difference is the direct current path DCP is now associated with two lamps 216, 217 connected in series. It will be enough to remove only one of the two lamps (as in Mode B), and the device will be turned OFF by the control circuit 58. Of course, it will be enough to re-insert that one lamp (as in Mode C) to provide for normal start-up and operation of the device.

Also, all above modes of operation apply to the circuit of FIG. 3 as another alternative version of the circuit of FIG. 1. The DC current path DCP between terminal B+ and terminal CTa is here associated with all four filaments 12, 312, 313, and 15 of the two lamps 311, 306. The filaments are connected in series circuit in the path. It will be enough to remove at least one end of at least one lamp (as in Mode B), and the device will be turned OFF by the control circuit 58. Of course, it will

9

be enough to re-insert that one end of the lamp (as in Mode C) to provide for normal start-up and operation of the device.

Operation of the Device of FIG. 4

Mode A

At power up, the direct current starts to flow in the direct current path DCP from terminal B+ through: filament 412, resistor 418, filament 415, winding 428, resistor 440 to charge capacitor 442. After predetermined time T1, when the voltage across capacitor 442 reaches a level high enough to cause the diac 444 to breakover, the transistor 452 is turned ON, and the device starts to oscillate. When the transistor 452 is turned ON periodically and alternately with the transistor 451, the charge from the capacitor 442 is removed with every oscillation cycle through diode 439. Also, the capacitor 438 is charged through a direct current path DCP and the resistor 435 to provide a signal to the base of the transistor 443. After a predetermined time T2, which is longer than T1, when the voltage across capacitor 438 will reach a level sufficient enough to turn ON the transistor 443, the trigger capacitor 442 will be held discharged for any time period as long as: (i) there is an unbroken direct current path DCP between terminal B+ and the pin-terminal P5, and DC voltage is present at all times between terminals B+, B-; (ii) the device oscillating and charging currents to the capacitors 442 and 438 are provided by an AC voltage potential associated with the intermediate terminal 427 in reference to the terminal B-.

The trigger circuit 402 arranged as above provides only one trigger pulse per power-up, to initiate the oscillations of the device.

Mode B

While the device is operational as in Mode A, when the fluorescent lamp 416 is removed from its holders voltage magnitude across the winding 434 rises dramatically, as this is natural behavior of the series-resonant circuit. The sensing winding 434 provides charging current to the capacitor 433, and voltage across that capacitor rises. Whenever that voltage reaches a level high enough to breakover the diac 445, the transistor 448 is turned ON for a brief period, and oscillations of the device are stopped. The direct current path DCP between terminal B+ is broken due to missing filaments 412, 415 of the lamp 416. The direct current will not flow through DC blocking circuits 457, 460, and the starting capacitor 442 of the trigger circuit 402 will never get charged. Thus, the device will never start to oscillate on its own.

Mode C

The fluorescent lamp 416 is now re-inserted into its holders, and that will complete the direct current path DCP between terminal B+ and the pin-terminal P5 of the trigger circuit 402, and the device will be triggered into oscillation as in Mode A.

The above modes of operation all apply to the circuit of FIG. 5 as the alternative version of the circuit of FIG. 4. The difference is that the direct current path DCP is now associated with two lamps 416, 516 connected in series. It will be enough to remove only one of the two lamps (as in Mode B), and the oscillations of the device will be stopped by the one-shot disable circuit 401. Of course, it will be enough to re-insert that one lamp (as in Mode C) to provide for normal initiation of

5,436,529

10

the oscillations and operation of the device as in Mode A.

Furthermore, all of the above modes of operation apply to the circuit of FIG. 6 as another alternative version of the circuit of FIG. 4. The direct current path DCP between terminal B+ and the pin-terminal P5 is here associated with all four filaments 412, 512, 515, 415 of the two lamps 416, 516. The filaments are connected in a series circuit path. It will be enough to remove at least one end of at last one lamp (as in Mode B), and the oscillations of the device will be stopped by a one-shot sensing circuit 401. Of course, it will be enough to re-insert that one end of the lamp (as in Mode C) to provide for normal initiation of the oscillations and operation of the device as in Mode A.

Operation of the Device of FIG. 7

Mode A

At power up, the direct current starts to flow in the direct current path DCP from terminal B+ through: internal and external wiring, contact S1, lamp pin-terminal 706, contact S2, contact S3, lamp pin-terminal 708, contact S4, and resistor 714 to charge trigger capacitor 718. After a predetermined time T1, when the voltage across capacitor 718 reaches a level high enough to cause the diac 719 to breakover, the transistor 741 is turned ON, and the device starts to oscillate. When the transistor 741 is turned ON periodically and alternately with the transistor 740, the charge from the capacitor 718 is removed with every oscillation cycle through diode 720. Also, the capacitor 716 is charged through direct current path DCP and the resistor 713 to provide a signal to the base of the transistor 717. After a predetermined time T2, which is longer than T1, when the voltage across capacitor 716 will reach a level sufficient enough to turn ON the transistor 717, the trigger capacitor 718 will be held discharged for any time period as long as there is an unbroken direct current path DCP between the terminal B+ and the pin-terminal P1 of the trigger circuit 702, and DC voltage is present at all times between the terminals B+, B-.

The trigger circuit 702 arranged as above provides only one relatively short trigger pulse per power-up of the device, to effectively initiate the oscillations.

Mode B

While the device is operational as in Mode A, when one of the lamps (704) is removed from its holders, voltage magnitude across winding 727 rises dramatically, as this is natural behavior of the series-resonant circuit. The sensing winding 727 provides a charging current to the capacitor 733, and voltage across that capacitor rises. Whenever that voltage reaches a level high enough to breakover the diac 731, the transistor 734 is turned ON for a brief period, and oscillations of the device are stopped. The direct current path DCP between the terminal B+ is broken due to missing lamp 704 and associated with it pin-terminal 706. The direct current will not flow in direct current path DCP, and the trigger capacitor 718 of the trigger circuit 702 will never get charged. Thus, the device will never start to oscillate on its own.

Mode C

The fluorescent lamp 704 is now re-inserted into its holders, and that will complete the direct current path DCP between terminal B+ and the pin-terminal P1 of

11

the trigger circuit 702, and the device will be triggered into oscillation as in Mode A.

The circuit of FIG. 1 and all of its alternative variations, equipped with the control circuit and equipped with DC current blocking circuits coupled across at least one filament of at least one lamp provides for an ideally controlled series-resonant ballast for gas discharge lamps.

The control circuits, as described in the present invention, provide superb protection for the ballast in all fault modes like: starting lamps in very low temperatures, end of lamp life and all behaviors associated with it, power-up with, so-called, degased lamps and more.

Furthermore, the circuit of FIG. 4 and all of its alternative variations, equipped with one-shot trigger circuits and one-shot disable circuits, and equipped with DC blocking circuits coupled across at least one filament of at least one lamp, provide for an ideally controlled series-resonant ballast for gas discharge lamps.

The ballast constructed as described above (i) will not oscillate and will not draw any power from a supply voltage source whenever lamps are removed or inoperative; (ii) will ignite new lamps after relamping, without turning voltage source OFF and ON; (iii) can be adapted to any lamp type and any power line voltage magnitude; (iv) will be very simple, easily manufacturable and inexpensive.

It will be understood, that all other circuit arrangements, for example: one lamp type device similar to that described in FIG. 7 and equipped with the control circuit of FIG. 1, is another alternative version, and is another embodiment of this invention.

It will be understood, that all other types of oscillatory circuits, either self-oscillatory or driven, half-bridge or full bridge type, fly-back, forward or Class E type—can be equipped with presently described control circuits, one-shot trigger, one-shot disable and DC blocking circuits, and all combinations thereof.

It is believed that the present invention and its several attendant advantages and features will be understood from the preceding description. However, without departing from the spirit of the invention, changes may be made in its form and in the construction and interrelationships of its components parts, the form herein presented merely representing the presently preferred embodiments.

I claim:

1. An energy conversion device employing an oscillating resonant converter producing oscillations, having DC input terminals producing a control signal and adapted to power at least one gas discharge lamp having heatable filaments, the device comprising:

voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals;

output terminals connected to the filaments of the gas discharge lamp;

control means capable of receiving control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective.

5,436,529

12

2. The device according to claim 1 wherein the resonant converter comprises a capacitor and an inductor connected in series via an intermediate node.

3. The device according to claim 2 wherein the control means is connected to receive the control signal from the intermediate node.

4. The device according to claim 3 wherein the control means receives the control signal from the DC input terminals and the signal flows through the output terminals and the intermediate node.

5. The device according to claim 1 wherein the direct current blocking means includes a capacitor and is connected effectively across at least one heatable filament of at least one gas discharge lamp.

6. An energy conversion device employing oscillating resonant converter, having DC input terminals and adapted to power at least one gas discharge lamp having heatable filaments, and comprising:

voltage source means able to provide constant or variable magnitude of a DC voltage between the DC input terminals;

output terminals for connection to the filaments of at least one gas discharge lamp;

one-shot trigger means coupled to the DC input terminals and to the resonant converter, and (i) able to receive a trigger control signal from the DC input terminals, and (ii) operable to provide one trigger pulse to effectively initiate the oscillations;

one-shot disable means magnetically coupled to the resonant converter, and (i) able to receive a disable control signal from the resonant converter, and (ii) operable to provide one disable pulse to effectively stop the oscillations; and

direct current blocking means coupled to the output terminals and effectively across at least one heatable filament of at least one lamp, and operable to stop flow of the trigger control signal from the DC input terminals, whenever at least one end of at least one lamp is removed from the output terminals or the lamp is defective.

7. Device according to claim 6 wherein the resonant converter comprises an inductor equipped with a primary winding and magnetically coupled secondary winding.

8. Device according to claim 7 wherein the one-shot trigger means receives the trigger control signal and the signal flows through the output terminals and the primary winding.

9. Device according to claim 7 wherein the one-shot disable means receives the disable control signal from the secondary winding of the inductor.

10. Device according to claim 6 wherein the direct current blocking means include a capacitor and are connected effectively across at least one heatable filament of at least one gas discharge lamp.

11. Device according to claim 6 wherein the direct current blocking means include a semiconductor diode and are connected effectively across at least one heatable filament of at least one gas discharge lamp.

12. An energy conversion device employing at least one oscillating resonant converter, having DC voltage input terminals, adapted to power at least one gas discharge lamp, and comprising:

voltage source means able to provide constant or variable magnitude of a DC voltage between the DC input terminals;

output terminals for connection to at least one gas discharge lamp;

5,436,529

13

one-shot trigger means coupled to the DC input terminals and to the output terminals, and (i) able to receive a trigger control signal from the DC input terminals, and (ii) operable to provide one trigger pulse to effectively initiate the oscillations;

one-shot disable means magnetically coupled to each and every one of the resonant converters, and (i) able to receive a disable control signal from each and every one of the resonant converters, and (ii) operable to provide one disable pulse to effectively stop the oscillations; and

disconnect means coupled to the DC input terminals and to the output terminals, and operable to stop flow of the trigger control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals.

13. Device according to claim 12 wherein each an every one resonant converter is having an inductor equipped with a primary winding and magnetically coupled secondary winding.

14. Device according to claim 12 wherein the one-shot disable means receives the disable signal from the secondary winding.

15. Device according to claim 12 wherein the disconnect means comprises an internal and external wiring arranged to disconnect each and every one of the resonant converters from the DC input terminals whenever at least one lamp is removed from the output terminal.

16. Device according to claim 12 wherein the one-shot trigger means receives the trigger control signal, and the signal flows through the disconnect means and through the output terminal.

17. An energy conversion device employing at least one oscillating resonant converter, having DC input terminals and adapted to power at least one gas discharge lamp having heatable filaments, and comprising:

voltage source means able to provide constant or variable magnitude of a DC voltage between the DC input terminals;

output terminals for connection to the filaments of at least one gas discharge lamp;

14

one-shot trigger means coupled to the DC input terminals and to each and every one of the resonant converters, and (i) able to receive a trigger control signal from the DC input terminals, and (ii) operable to provide one trigger pulse to effectively initiate the oscillations;

one-shot disable means magnetically coupled to each and every one of the resonant converters, and (i) able to receive a disable control signal from each and every one of the resonant converters, and (ii) operable to provide one disable pulse to effectively stop the oscillations; and

direct current blocking means coupled to the output terminals and effectively across at least one heatable filament of at least one lamp, and operable to stop flow of the trigger control signal from the DC input terminals, whenever at least one end of at least one lamp is removed from the output terminals or the lamp is defective.

18. An energy conversion device employing an oscillating resonant converter, having DC input terminals and adapted for powering at least one gas discharge lamp having heatable filaments, the device comprising:

voltage source means able to provide a constant or variable magnitude DC voltage between the DC input terminals;

output terminals for connection to the filaments of the gas discharge lamp;

control means able to receive control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and

direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective wherein the direct current blocking means includes a semiconductor diode and is connected effectively across at least one heatable filament of at least one gas discharge lamp.

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JS 44 (Rev. 12/07)

Case 7:09-cv-00029-O Document 1-3 Filed 02/24/09 Page 1 of 2 PageID 23

CIVIL COVER SHEET

The JS 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. (SEE INSTRUCTIONS ON THE REVERSE OF THE FORM.)

I. (a) PLAINTIFFS LIGHTING BALLAST CONTROL LLC (b) County of Residence of First Listed Plaintiff _____ (EXCEPT IN U.S. PLAINTIFF CASES) (c) Attorney's (Firm Name, Address, and Telephone Number) Jonathan T. Suder, Friedman Suder & Cooke, 604 E. 4th St., #200, Fort Worth, TX 76102 817.334.0400		DEFENDANTS ADVANCE TRANSFORMER CO., ET AL County of Residence of First Listed Defendant _____ (IN U.S. PLAINTIFF CASES ONLY) NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF THE LAND INVOLVED. Attorneys (If Known) _____													
II. BASIS OF JURISDICTION (Place an "X" in One Box Only) <input type="checkbox"/> 1 U.S. Government Plaintiff <input type="checkbox"/> 2 U.S. Government Defendant <input checked="" type="checkbox"/> 3 Federal Question (U.S. Government Not a Party) <input type="checkbox"/> 4 Diversity (Indicate Citizenship of Parties in Item III)		III. CITIZENSHIP OF PRINCIPAL PARTIES (Place an "X" in One Box for Plaintiff and One Box for Defendant) <table style="width: 100%;"> <tr> <td style="width: 33%;">Citizen of This State</td> <td style="width: 33%;">PTF DEF <input type="checkbox"/> 1 <input type="checkbox"/> 1</td> <td style="width: 33%;">Incorporated or Principal Place of Business In This State</td> <td style="width: 33%;">PTF DEF <input type="checkbox"/> 4 <input type="checkbox"/> 4</td> </tr> <tr> <td>Citizen of Another State</td> <td><input type="checkbox"/> 2 <input type="checkbox"/> 2</td> <td>Incorporated and Principal Place of Business In Another State</td> <td><input type="checkbox"/> 5 <input type="checkbox"/> 5</td> </tr> <tr> <td>Citizen or Subject of a Foreign Country</td> <td><input type="checkbox"/> 3 <input type="checkbox"/> 3</td> <td>Foreign Nation</td> <td><input type="checkbox"/> 6 <input type="checkbox"/> 6</td> </tr> </table>		Citizen of This State	PTF DEF <input type="checkbox"/> 1 <input type="checkbox"/> 1	Incorporated or Principal Place of Business In This State	PTF DEF <input type="checkbox"/> 4 <input type="checkbox"/> 4	Citizen of Another State	<input type="checkbox"/> 2 <input type="checkbox"/> 2	Incorporated and Principal Place of Business In Another State	<input type="checkbox"/> 5 <input type="checkbox"/> 5	Citizen or Subject of a Foreign Country	<input type="checkbox"/> 3 <input type="checkbox"/> 3	Foreign Nation	<input type="checkbox"/> 6 <input type="checkbox"/> 6
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IV. NATURE OF SUIT (Place an "X" in One Box Only) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 25%;">CONTRACT</th> <th style="width: 25%;">TORTS</th> <th style="width: 25%;">FORFEITURE/PENALTY</th> <th style="width: 25%;">BANKRUPTCY</th> <th style="width: 25%;">OTHER STATUTES</th> </tr> <tr> <td style="vertical-align: top;"> <input type="checkbox"/> 110 Insurance <input type="checkbox"/> 120 Marine <input type="checkbox"/> 130 Miller Act <input type="checkbox"/> 140 Negotiable Instrument <input type="checkbox"/> 150 Recovery of Overpayment & Enforcement of Judgment <input type="checkbox"/> 151 Medicare Act <input type="checkbox"/> 152 Recovery of Defaulted Student Loans (Excl. 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VI. CAUSE OF ACTION Cite the U.S. Civil Statute under which you are filing (Do not cite jurisdictional statutes unless diversity): <u>35 U.S.C. 271 and 2</u> Brief description of cause: <u>patent infringement</u>															
VII. REQUESTED IN COMPLAINT: <input type="checkbox"/> CHECK IF THIS IS A CLASS ACTION UNDER F.R.C.P. 23 DEMAND \$ _____ CHECK YES only if demanded in complaint: JURY DEMAND: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No															
VIII. RELATED CASE(S) IF ANY (See instructions): JUDGE _____ DOCKET NUMBER _____															
DATE _____ SIGNATURE OF ATTORNEY OF RECORD _____															

FOR OFFICE USE ONLY

RECEIPT # _____ AMOUNT _____ APPLYING IFP _____ JUDGE _____ MAG. JUDGE _____

Case 7:09-cv-00029-O Document 1-3 Filed 02/24/09 Page 2 of 2 PageID 24
JS 44 Reverse (Rev. 12/07)**INSTRUCTIONS FOR ATTORNEYS COMPLETING CIVIL COVER SHEET FORM JS 44****Authority For Civil Cover Sheet**

The JS 44 civil cover sheet and the information contained herein neither replaces nor supplements the filings and service of pleading or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. Consequently, a civil cover sheet is submitted to the Clerk of Court for each civil complaint filed. The attorney filing a case should complete the form as follows:

I. (a) Plaintiffs-Defendants. Enter names (last, first, middle initial) of plaintiff and defendant. If the plaintiff or defendant is a government agency, use only the full name or standard abbreviations. If the plaintiff or defendant is an official within a government agency, identify first the agency and then the official, giving both name and title.

(b) County of Residence. For each civil case filed, except U.S. plaintiff cases, enter the name of the county where the first listed plaintiff resides at the time of filing. In U.S. plaintiff cases, enter the name of the county in which the first listed defendant resides at the time of filing. (NOTE: In land condemnation cases, the county of residence of the "defendant" is the location of the tract of land involved.)

(c) Attorneys. Enter the firm name, address, telephone number, and attorney of record. If there are several attorneys, list them on an attachment, noting in this section "(see attachment)".

II. Jurisdiction. The basis of jurisdiction is set forth under Rule 8(a), F.R.C.P., which requires that jurisdictions be shown in pleadings. Place an "X" in one of the boxes. If there is more than one basis of jurisdiction, precedence is given in the order shown below.

United States plaintiff. (1) Jurisdiction based on 28 U.S.C. 1345 and 1348. Suits by agencies and officers of the United States are included here.

United States defendant. (2) When the plaintiff is suing the United States, its officers or agencies, place an "X" in this box.

Federal question. (3) This refers to suits under 28 U.S.C. 1331, where jurisdiction arises under the Constitution of the United States, an amendment to the Constitution, an act of Congress or a treaty of the United States. In cases where the U.S. is a party, the U.S. plaintiff or defendant code takes precedence, and box 1 or 2 should be marked.

Diversity of citizenship. (4) This refers to suits under 28 U.S.C. 1332, where parties are citizens of different states. When Box 4 is checked, the citizenship of the different parties must be checked. (See Section III below; federal question actions take precedence over diversity cases.)

III. Residence (citizenship) of Principal Parties. This section of the JS 44 is to be completed if diversity of citizenship was indicated above. Mark this section for each principal party.

IV. Nature of Suit. Place an "X" in the appropriate box. If the nature of suit cannot be determined, be sure the cause of action, in Section VI below, is sufficient to enable the deputy clerk or the statistical clerks in the Administrative Office to determine the nature of suit. If the cause fits more than one nature of suit, select the most definitive.

V. Origin. Place an "X" in one of the seven boxes.

Original Proceedings. (1) Cases which originate in the United States district courts.

Removed from State Court. (2) Proceedings initiated in state courts may be removed to the district courts under Title 28 U.S.C., Section 1441. When the petition for removal is granted, check this box.

Remanded from Appellate Court. (3) Check this box for cases remanded to the district court for further action. Use the date of remand as the filing date.

Reinstated or Reopened. (4) Check this box for cases reinstated or reopened in the district court. Use the reopening date as the filing date.

Transferred from Another District. (5) For cases transferred under Title 28 U.S.C. Section 1404(a). Do not use this for within district transfers or multidistrict litigation transfers.

Multidistrict Litigation. (6) Check this box when a multidistrict case is transferred into the district under authority of Title 28 U.S.C. Section 1407. When this box is checked, do not check (5) above.

Appeal to District Judge from Magistrate Judgment. (7) Check this box for an appeal from a magistrate judge's decision.

VI. Cause of Action. Report the civil statute directly related to the cause of action and give a brief description of the cause. **Do not cite jurisdictional statutes unless diversity.** Example: U.S. Civil Statute: 47 USC 553
Brief Description: Unauthorized reception of cable service

VII. Requested in Complaint. Class Action. Place an "X" in this box if you are filing a class action under Rule 23, F.R.Cv.P.

Demand. In this space enter the dollar amount (in thousands of dollars) being demanded or indicate other demand such as a preliminary injunction.

Jury Demand. Check the appropriate box to indicate whether or not a jury is being demanded.

VIII. Related Cases. This section of the JS 44 is used to reference related pending cases if any. If there are related pending cases, insert the docket numbers and the corresponding judge names for such cases.

Date and Attorney Signature. Date and sign the civil cover sheet.

PLAINTIFF'S OPENING BRIEF ON CLAIM CONSTRUCTION (DKT 84)

evidence, and close questions of indefiniteness 'are properly resolved in favor of the patentee.'" *Id.*, quoting *Datamize*, 417 F.3d at 1348; *Exxon Research & Eng'g Co.*, 265 F.3d at 1380.

V. DISPUTED CLAIM TERMS

Plaintiff has asserted Claims 1-5 and 18 (the "Asserted Claims") against various accused products. Independent Claims 1 and 18 are nearly identical, with Claim 18 adding one additional limitation relating to a "diode." The disputed claim terms in this case come from independent Claims 1 and 18. The parties seek construction of three alleged means-plus function limitations, and four other claim terms, as set forth below.

A. Alleged means-plus function limitations

The parties disagree about the proper application of § 112, P 6 as it relates to three disputed limitations: (a) the "voltage source" limitation, (b) the "control means" limitation, and (c) the "direct current blocking means" limitation. The parties also disagree about the proper construction of four claim terms: (a) "oscillating resonant converter," (b) "DC input terminals," (c) "DC input terminals producing a control signal," and (d) "whenever at least one gas discharge lamp is removed from the output terminals of is defective." Plaintiff will first address the means-plus-function issues.

1. "voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals" (Claims 1, 18)

Issue	Plaintiff's Position	Defendants' Position
§ 112, P 6 applies?	No.	Yes.
Function(s)	N/A	"providing a constant or variable magnitude DC voltage between the DC input terminals"
Corresponding structure	N/A	None, therefore asserted claims invalid under 35 U.S.C. § 112, P 1&2.

The "voltage source" limitation connotes sufficient structure to one skilled in the art and is therefore not subject to § 112, P 6 treatment. *See Mass. Inst. of Tech.*, 462 F.3d at 1354 ("it is sufficient to avoid § 112, P 6 treatment if the claim term is used in common parlance or by

persons of skill in the pertinent art to designate structure, even if the term covers a broad class of structures and even if the terms identify the structures by their function”).

To determine whether the claim language connotes sufficient structure, the Court should consider: (a) all of the recited claim language, including nouns, adjectival modifiers, and functional descriptions, and (b) whether that claim language has an understood meaning in the art when read in the context of the specification. *See Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1320 (Fed. Cir. 2004).

In his deposition, Bobel established himself as one skilled in the art and testified unequivocally that the voltage source limitation connotes the structure of a rectifier to anyone skilled in the art. *See* Exh. 2A, Bobel Depo. at 226:15 - 227:25; 229:14 - 234:5. In other words, the only way a lighting ballast would ever convert AC (from a “power line source”) into DC (for use as the “DC supply voltage”) is through the use of a rectifier. *Id.* Bobel further explained that a battery could likewise provide the necessary DC supply voltage described in the patent. In either case, one skilled in the art could ascertain and implement the structure necessary to supply the DC supply voltage, based on the particular application of the ballast in question.

Dr. Victor Roberts is also skilled in the art of power electronics and lighting ballast design. In his Declaration, he explained that the “voltage source” limitation, when viewed in the context of the specification and claims, suggests to him a sufficient structure, or class of structures, namely: a rectifier (if converting AC from a “power line source” to DC for a “DC supply voltage”) or a battery (if providing the DC supply voltage directly to the DC input terminals). Exh. 3, ¶ 22. As such, § 112, P 6 does not apply. *See id.* at 1322 (“that the disputed term is not limited to a single structure does not disqualify it as a corresponding structure, as long as the class of structures is identifiable by a person of ordinary skill in the art”).

In the alternative, if the Court determines that § 112, P 6 applies, then the specification

JOINT OPENING BRIEF ON CLAIM CONSTRUCTION (DKT 85)

A463 – A486 REMOVED DUE TO CONFIDENTIAL MATERIAL

A651 – A662 REMOVED DUE TO CONFIDENTIAL MATERIAL

MEMORANDUM OPINION AND ORDER
REGARDING CLAIM CONSTRUCTION (DKT 101)

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION**

**LIGHTING BALLAST CONTROL,
LLC,**

Plaintiff,

v.

**PHILIPS ELECTRONICS NORTH
AMERICA CORP., et al.,**

Defendants.

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CIVIL ACTION NO. 7:09-CV-29-O

MEMORANDUM OPINION AND ORDER

This is a patent infringement case. The invention at issue is a lighting product, specifically an electronic ballast. A ballast is a device for starting and regulating florescent and other types of lamps. A ballast provides proper voltage to light the lamp, and regulates the electric current flowing through the lamp to control light output. The ballasts at issue in this case are designed to power florescent lamps with heatable filaments. The parties dispute various claim terms in United States Patent 5,436,529 ("529 Patent") issued on July 25, 1995 and entitled "CONTROL AND PROTECTION CIRCUIT FOR ELECTRONIC BALLAST." The Court has construed the disputed claim terms after reviewing the briefs and responses of the parties, the applicable law, and where appropriate, any extrinsic evidence submitted by the parties.

I. BACKGROUND

The Court sets forth only those facts necessary to provide context for the claim construction. Plaintiff Lighting Ballast Control, LLC, ("Lighting Ballast") holds the exclusive

right to enforce the 529 Patent. The inventor is Andrzej “Andrew” Bobel. The 529 Patent covers a lighting ballast that powers florescent lamps with heatable filaments. An electronic ballast practicing the 529 Patent operates in three different stages: (1) the initial start-up of the ballast, (2) the shut-down or sleep-mode of the ballast, and (3) the re-starting of the ballast after an inoperable lamp has been replaced. Pl.’s Opening Br. Cl. Const. 4, ECF No. 84. The invention was intended to address significant technical challenges facing the ballast industry in 1993; specifically, how to preserve the integrity of the ballast by not drawing power from a power line source when a lamp is removed or defective, and by not having to turn the power OFF and ON when the lamp is replaced. *Id.* at 6. The invention covered by the 529 Patent was intended to remedy these issues in a safe, energy efficient, and affordable manner. *Id.*

Lighting Ballast sues Defendant Universal Lighting Technologies, Inc. (“Universal”) claiming infringement of the 529 Patent because Universal manufactures, uses, or sells electronic ballasts utilizing circuitry that monitors the voltage across one or more lamps and provides end-of-life protection for multiple types of failures.¹ Pl.’s Orig. Compl. 4, ECF No. 1. Lighting Ballast specifically points to the ULT B254PUNV-D ballast as infringing on one or more claims of the 529 Patent. *Id.* Universal denies any infringement and brings a counterclaim seeking a declaration that Universal has not infringed any of the claims of the 529 Patent, and that the patent is invalid. Def.’s Am. Answer 7, ECF No. 70.

II. LEGAL STANDARDS - PATENT CLAIM CONSTRUCTION

Patent infringement is the unauthorized making, using, selling, offering to sell, or

¹ Lighting Ballast originally sued several defendants, however, Universal is the only remaining defendant in the case, pending final settlement with Philips Electronics North America Corp.

Case 7:09-cv-00029-O Document 101 Filed 08/19/10 Page 3 of 19 PageID 863

importing into the United States of any patented invention during the term of the patent. 35 U.S.C. § 271(a). In a patent infringement case, a court first determines the proper construction of the patent claims by establishing, as a matter of law, the scope and boundaries of the subject-matter of the patent. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370, 384-85 (1996). Second, the trier of fact compares the properly construed claims to the allegedly infringing device(s) and determines whether there has been an infringement. *Id.* The issue before the Court is the proper construction of certain disputed claims in the 529 Patent.

A. Rules of Claim Construction

The claims of a patent are the numbered paragraphs at the end of the patent that define the scope of the invention, and thus the scope of the patentee's right to exclude others from making, using, or selling the patented invention. *See Astrazeneca AB v. Mutual Pharm. Co.*, 384 F.3d 1333, 1335-36 (Fed. Cir. 2004). Claim construction is the process of giving proper meanings to the claim language thereby defining the scope of the protection. *See Bell Commc'ns Research, Inc. v. Vitalink Commc'ns Corp.*, 55 F.3d 615, 619 (Fed. Cir. 1995) (internal citations omitted).

Claim construction starts with the language of the claim itself since a patent's claims define the invention to which the patentee is entitled the right to exclude. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). "The claims themselves provide substantial guidance as to the meaning of particular claim terms." *Id.* at 1314. Moreover, claim terms should be given their ordinary and customary meaning as understood by a person of ordinary skill in the art as of the effective filing date of the patent application. *Id.* at 1313. This is because a patent is

addressed to, and intended to be read by, others skilled in the particular art. *Id.* However, the patentee is free to define his own terms, so long as any special definition given to a term is clearly defined in the specification. *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1388 (Fed. Cir. 1992).

When construing disputed claim terms the court should look first to the intrinsic record of the patent, including the claims and the specification, to determine the meaning of words in the claims. *Nazomi Commc'ns., Inc. v. Arm Holdings, PLC*, 403 F.3d 1346, 1368 (Fed. Cir. 2005). “The specification is always highly relevant to the claim construction analysis. Usually it is dispositive; it is the single best guide to the meaning of a disputed term.” *Phillips*, 415 F.3d at 1315. The specification acts as a dictionary when it expressly or implicitly defines terms. *Id.* at 1321. Courts should also refer to the prosecution history if it is in evidence. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). The prosecution history is part of the intrinsic record and consists of a complete record of all proceedings before the United States Patent and Trademark Office, including prior art cited during the examination of the patent, and express representations made by the applicant as to the scope of the claims. *Id.*

The Federal Circuit has also stated that district courts may “rely on extrinsic evidence, which consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” *Id.* (internal quotations omitted). Dictionaries and treatises can be “useful in claim construction[,]” particularly technical dictionaries which may help the court “to better understand the underlying technology and the way in which one of skill in the art might use the claim terms.” *Id.* at 1318 (internal quotations omitted). As to expert testimony, the Federal Circuit has stated:

[E]xtrinsic evidence in the form of expert testimony can be useful to a court for a variety of purposes, such as to provide background on the technology at issue, to explain how an invention works, to ensure that the court's understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field.

Id. However, “a court should discount any expert testimony that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent.” *Id.* (internal quotations omitted). Extrinsic evidence is less significant than the intrinsic record and undue reliance on it may pose a risk of changing the meaning of claims, contrary to the public record contained in the written patent. *Id.* 1317, 1319.

B. Means-Plus-Function Limitations

Pursuant to 35 U.S.C. § 112 ¶ 6 a patentee may express a claim limitation by reciting a function to be performed by a generic means, rather than reciting in the claim the actual structure for performing the particular function. Section 112, ¶ 6 provides:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Section 112, ¶ 6 thus “operates to restrict claim limitations drafted in such functional language to those structures, materials, or acts disclosed in the specification (and their equivalents) that perform the claimed function.” *Personalized Media Comm'ns, LLC v. Int'l Trade Comm'n*, 161 F.3d 696, 703 (Fed. Cir. 1999). “The point of the requirement that the patentee disclose particular structure in the specification and that the scope of the patent claims be limited to that

structure and its equivalents is to avoid pure functional claiming.” *Aristocrat Techs. Australia Pty Ltd. v. Int’l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008).

The determination of whether a particular limitation should be regarded as a means-plus-function limitation is a question of law, even though it is a question on which evidence from experts may be relevant. *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1358 (Fed. Cir. 2004) (citations omitted). The *Lighting World* court set forth the standard to be used when determining whether to apply section 112, ¶ 6 to a claim limitation:

A claim limitation that actually uses the word “means” invokes a rebuttable presumption that § 112, ¶ 6 applies. By contrast, a claim term that does not use “means” will trigger the rebuttable presumption that § 112, ¶ 6 does not apply. The use of the term “means” is central to the analysis because the term “means,” particularly as used in the phrase “means for,” is part of the classic template for functional claim elements and has come to be closely associated with means-plus-function claiming.

Id. at 1358. However, claim language that further defines a generic term, such as nouns or adjectival qualifications that appear before or after the word “means,” can add or suggest sufficient structure to avoid section 112, ¶ 6. *Mass. Inst. of Tech. v. Abacus Software*, 462 F.3d 1344, 1354 (Fed. Cir. 2006). Moreover, section 112, ¶ 6 may be avoided where “the claim term is used in common parlance or by persons of skill in the pertinent art to designate structure, even if the term covers a broad class of structures and even if the terms identify the structures by their function.” *Id.* at 1356 (quotations and citations omitted).

Claim construction of a means-plus-function limitation has two steps: “First, the court must determine the claimed function. Second, the court must identify the corresponding structure in the written description of the patent that performs that function.” *Applied Med. Res. Corp. v. U.S. Surgical Corp.*, 448 F.3d 1324, 1332 (Fed. Cir. 2006). The claimed function is recited in the

Case 7:09-cv-00029-O Document 101 Filed 08/19/10 Page 7 of 19 PageID 867

claim itself, and the corresponding structure “must not only perform the claimed function [but] the specification must clearly associate the structure with the performance of the function.”

Cardiac Pacemakers, Inc. v. St. Jude Med., Inc., 296 F.3d 1106, 1113 (Fed. Cir. 2002). The court should first inquire as to whether “structure is described in [the] specification, and, if so, whether one skilled in the art would identify the structure from that description.” *Atmel Corp. v. Info. Storage Devices, Inc.*, 198 F.3d 1374, 1381 (Fed. Cir. 1999). “The inquiry is whether one of skill in the art would understand the specification itself to disclose a structure, not simply whether that person would be capable of implementing a structure.” *Biomedino, LLC v. Waters Techs. Corp.*, 490 F.3d 946, 953 (Fed. Cir. 2007).

III. ANALYSIS

The parties have presented two claims from the 529 Patent for construction. Claim 1 recites (with the disputed claim limitations emphasized in bold):

1. An energy conversion device employing an **oscillating resonant converter** producing oscillations, having **DC input terminals producing a control signal** and adapted to power at least one gas discharge lamp having heatable filaments, the device comprising:

voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals;

output terminals connected to the filaments of the gas discharge lamp;

control means capable of receiving control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and a direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective.

Pl.'s Opening App. 14, ECF No. 84-1.

Claim 18 recites (again with the disputed claim limitations emphasized in bold):

18. An energy conversion device employing an **oscillating resonant converter**, having **DC input terminals** and adapted for powering at least one gas discharge lamp having heatable filaments, the device comprising:

voltage source means able to provide a constant or variable magnitude DC voltage between the DC input terminals;

output terminals for connection to the filaments of the gas discharge lamp;

control means able to receive control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and

direct current blocking means coupled to output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective wherein the direct current blocking means includes a semiconductor diode and is connected effectively across at least one heatable filament of at least one gas discharge lamp.

Pl.'s Opening App. 15, ECF No. 84-1. Independent Claims 1 and 18 are nearly identical, with Claim 18 adding one additional limitation relating to a diode. Pl.'s Opening Br. 14, ECF No. 84. The disputed issues come from Claims 1 and 18; the parties dispute the construction of three alleged means-plus-function limitations, and four other terms. *Id.* The Court will turn to the disputed limitations, the first of which appears in both Claims 1 and 18.

A. Voltage Source Means Dispute

The parties dispute whether the limitation “voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals” is a function-plus-means

limitation, subject to construction as limited by section 112, ¶ 6. Lighting Ballast argues that “voltage source” connotes sufficient structure to one skilled in the art and that it should avoid treatment as a means-plus-function limitation. In the alternative, Lighting Ballast argues that if the Court determines that section 112, ¶ 6 applies, then the specification discloses the corresponding structure. Universal argues that the term should be treated as a means-plus-function limitation because it is written in means-plus-function format, and furthermore, that the specification does not disclose a corresponding structure, making both claims in which the limitation appears indefinite.

1. Plaintiff's Proposed Construction

Lighting Ballast argues that this limitation, while using the term “means,” is not a means-plus-function limitation because the term “voltage source” has an understood meaning in the art when read in the context of the specification. *See* Pl.’s Opening Br. 14-15, ECF No. 84. Specifically, according to Lighting Ballast, “voltage source means [providing (claim 1), able to provide (claim 18)] a constant or variable magnitude DC voltage between the DC input terminals” connotes the structure of a rectifier to anyone skilled in the art. *Id.* at 15. As support for this assertion Lighting Ballast points to extrinsic evidence: expert testimony from Andrew Bobel, the inventor, who has several years of experience working on electronic ballast designs, and Dr. Victor Roberts, an expert witness. *Id.* Both Bobel and Dr. Roberts testify, that as persons skilled in the art, the “voltage source” limitation clearly connotes the structure of a rectifier. Pl.’s Opening App. Ex. 2-A at 226, ECF No. 84-3; Ex. 3 at 7-8, ECF No. 84-7. In the alternative, Lighting Ballast argues that if the Court determines that section 112, ¶ 6 applies, making the limitation a means-plus-function limitation, then the limitation clearly discloses the structure of a

rectifier. Pl.'s Opening Br. 15-16, ECF No. 84.

2. *Defendant's Proposed Construction*

Universal argues that this limitation is governed by section 112, ¶ 6 as a means-plus-function limitation. Def.'s Opening Br. 16, ECF No. 85. First, Universal points to the use of the term "means," which presumptively invokes section 112, ¶ 6. *Id.* Secondly, according to Universal, the limitation itself clearly recites a function only. *Id.* And third, the claim language does not point to any structure. *Id.* Thus, Universal asserts, this limitation is a classic means-plus-function limitation and must be construed according to section 112, ¶ 6. Universal then goes on to argue that the specification for the 529 Patent does not disclose any structure, a rectifier or otherwise, for performing the claimed function. *Id.* 18-20. Accordingly, Universal urges that Claims 1 and 18 should be held invalid because they are indefinite.

3. *Court's Analysis and Construction*

The Court begins with the presumption that this is a means-plus-function limitation, subject to construction under section 112, ¶ 6 because it uses the term "means," and is written in a classic means-plus-function format. *See Kemco Sales, Inc. v. Control Papers Co., Inc.*, 208 F.3d 1352, 1361 (Fed. Cir. 2000). Lighting Ballast asserts that the presumption should not apply because, despite use of the term "means," the limitation recites sufficient structure to avoid section 112, ¶ 6. To determine whether the limitation "voltage source means" connotes sufficient structure, the Court must first consider all of the recited claim language, including nouns, adjectival modifiers, and function descriptions, and secondly, determine whether that claim language has an understood meaning in the electronic ballast field when read in the context of the 529 Patent specification. *See Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d

Case 7:09-cv-00029-O Document 101 Filed 08/19/10 Page 11 of 19 PageID 871

1311, 1320 (Fed. Cir. 2004).

The words “voltage source” precede “means,” which is followed by the claimed function, “[providing/able to provide] a constant or variable magnitude DC voltage between the DC input terminals.” Lighting Ballast argues, as it must in order to avoid section 112, ¶ 6, that “voltage source” connotes sufficient structure, in this case, a rectifier. However, in order to come to this conclusion, Plaintiff uses the recited function along with inventor and expert testimony, that a rectifier would be required where the function is “providing a constant or variable magnitude DC voltage.” Lighting Ballast also points the Court to case law stating “it is sufficient to avoid [section 112, ¶ 6] treatment if the claim term is used in common parlance or by persons of skill in the pertinent art to designate structure, even if the term covers a broad class of structures and even if the terms identify the structures by their function.” *Mass. Inst. of Tech.*, 462 F.3d at 1356.

Universal argues that the term “source” and by extension, the term “voltage source,” is insufficient to connote structure and directs the Court to case law. In *Nilssen v. Motorola, Inc.*, the court held that even if the term “source” in “source means” connotes a device that provides power, this alone is not a sufficient structural recitation to remove the limitation from the ambit of section 112, ¶ 6. 80 F. Supp.2d 921, 928-29 (N.D. Ill. 2000). The difference here is that “source” is preceded by “voltage” obviously meaning that it is a source of voltage. However, the Court is inclined to agree with the *Nilssen* court, that even assuming “voltage source” connotes a structure, it is not a sufficient structural recitation to overcome the presumption in favor of section 112, ¶ 6.

Lighting Ballast’s argument that “voltage source” connotes sufficient structure to avoid means-plus-function construction is problematic for other reasons as well. First, Lighting Ballast

does not point the Court to any evidence, intrinsic or extrinsic, that the term “voltage source” is commonly used in the electronic ballast industry to mean a rectifier. Rather, Plaintiff relies on the description of the function, stating that persons of skill in the electronic ballast industry, including Bobel and Dr. Roberts, understand that this function, insofar as it includes supplying a DC voltage, can be and often is performed by a rectifier. Secondly, Lighting Ballast admits that a rectifier is not the only structure capable of providing a DC voltage, pointing out that a battery would also suffice. There is no indication that “voltage source” is often used synonymously with the term “rectifier” by those of ordinary skill in the electronic ballast industry, and Lighting Ballast does not appear to argue as much. In fact, the opposite would seem to be the case, since a rectifier is merely one voltage source. Lastly, neither the language of claim 1 or claim 18 describes the function of a rectifier. Rather, the recited function, “providing a constant or variable magnitude DC voltage between the DC input terminals,” refers only inferentially to the function of a rectifier.² For these reasons, the quotation from *Massachusetts Institute of Technology, supra*, does not assist Plaintiff in avoiding section 112, ¶ 6. Therefore, the Court finds that this limitation, even when read in the context of claims 1 and 18, of which it is a part, does not suggest sufficient structure on its face to overcome the means-plus-function presumption, and it must be construed in accordance with section 112, ¶ 6.

In order to construe the “voltage source means” limitation in accordance with section 112, ¶ 6, the Court must determine the claimed function, and then identify the corresponding structure in the written specification of the 529 Patent that performs that function. *See Applied*

² Dr. Roberts appears to acknowledge this fact when he states in his declaration that “one skilled in the art would immediately ascertain and implement the structure necessary to supply the DC supply voltage[.]” Pl.’s Opening App. Ex. 3 at 7-8, ECF No. 84-7.

Case 7:09-cv-00029-O Document 101 Filed 08/19/10 Page 13 of 19 PageID 873

Med. Res. Corp., 448 F.3d at 1332. The Federal Circuit has stated that section 112, ¶ 6 represents a *quid pro quo* by allowing inventors to use a generic means expression for a claim as long as the specification indicates the structure that constitutes the means. *See Atmel*, 198 F.3d at 1381. The section 112, ¶ 6 “tradeoff cannot be satisfied when there is a total omission of structure. There must be structure in the specification.” *Id.* at 1382. Once it is established that there is a disclosure of structure in the specification, the analysis proceeds to the sufficiency of the disclosure—whether one skilled in the art will know and understand what structure corresponds to the means limitation. *Id.* Therefore, as long as there is disclosure of structure, the written description in the 529 Patent need not explicitly describe the structure; rather, disclosure of the structure may be implicit so long as it meets the above test. *See id.* at 1380. However, the Court must bear in mind that the proper “inquiry is whether one of skill in the art would understand the specification itself to disclose a structure, not simply whether that person would be capable of implementing a structure.” *Biomedino*, 490 F.3d at 953. In other words, if no structure is disclosed, it is not sufficient that a person of skill in the art could implement a structure. *See id.*

As established *supra*, the claimed function is “providing [or (able to provide)] a constant or variable magnitude DC voltage between the DC input terminals.” Thus, the description in the 529 Patent must disclose a structure, either explicitly or implicitly, such that one with skill in the art would understand the disclosure to connote a structure, that performs this function. *See Atmel*, 198 F.3d at 1382. The parties do not dispute that the 529 Patent does not explicitly disclose the structure of a rectifier. Therefore, the issue turns on whether the specification in the 529 Patent implicitly discloses a rectifier as the structure to perform the above specified function.

The parties dispute this point. Lighting Ballast directs the Court to several references in the 529 Patent to drawing power from a power line source and to DC supply voltages. Pl.'s Opening Br. 16, ECF No. 84. Lighting Ballast, relying on testimony from Bobel and Dr. Roberts, argues that "the only structure that can perform such a function in a lighting ballast is a rectifier, which is implicit, but clear, from the specification's multiple references to 'a power line source' and 'a DC supply voltage.'" *Id.* Otherwise, Lighting Ballast does not point the Court to any language in the 529 Patent that discloses a structure. *See id.* Defendant, Universal, argues that the description in the 529 Patent does not disclose a corresponding structure, and that Lighting Ballast may not use expert testimony to suggest a structure that was not disclosed in the patent. Def.'s Resp. Br. 4-6, ECF No. 89.

Lighting Ballast relies on language from *Atmel*, where the court states that "disclosure of structure corresponding to a means-plus-function limitation may be implicit in the written description if it would have been clear to those skilled in the art what structure must perform the function recited in the means-plus-function limitation." 198 F.3d at 1380. However, this statement must be understood in its proper context. As noted *supra*, the central issue in the *Atmel* opinion was not whether there was a disclosure of a structure, the first step in the analysis, but whether the alleged disclosure would connote a structure to one skilled in the art. *See id.* at 1380-82. The appellant in *Atmel* argued that a citation to a particular article in the patent's specification, which included the article's title, was a sufficient disclosure of the structure at issue such that a person of skill in the art would understand the nature of the corresponding structure. *Id.* at 1380-81 ("Atmel specifically directs us to the testimony of its expert . . . that the mere mention of the *title* of the . . . article in the specification is sufficient for one skilled in the

Case 7:09-cv-00029-O Document 101 Filed 08/19/10 Page 15 of 19 PageID 875

art to envision the structures disclosed in that article”) (emphasis in original). The Federal Circuit agreed, holding that “interpretation of what is disclosed must be made in light of the knowledge of one skilled in the art.” *Id.* at 1380. Therefore, when the *Atmel* court made the statement above, relied on by Lighting Ballast, the court was specifically discussing the second step of the implied-disclosure analysis, the sufficiency of the alleged disclosure.

It is also worth noting that this language was itself used in a quotation in the *Atmel* opinion. *See id.* at 1380. The *Atmel* court was quoting from what were proposed supplemental guidelines from the PTO which were themselves adopted from the Federal Circuit’s *In re Dossel* opinion. *Id.*; *see In re Dossel*, 115 F.3d 942 (Fed. Cir. 1997). In *Dossel*, the court, like the *Atmel* court, was discussing the sufficiency of the the alleged disclosure of the structure corresponding to a means-plus-function limitation in a claim. *Id.* at 946. The specific structure at issue was a computer, however, neither the written specification nor the claims ever used the word computer. *Id.* Rather the description described the structure of a computer, by its functions—“clearly, a unit which receives digital data, performs complex mathematical computations and outputs the results to a display must be implemented by or on a general or special purpose computer.” *Id.* at 946-47. The *Dossel* court then stated that this conclusion was bolstered by the fact that “in the medical imaging field, it is well within the realm of common experience that computers are used to generate images for display by mathematically processing digital input.” *Id.* at 947. Thus, it is clear that the appellant in *Dossel* had overcome the initial hurdle of pointing to a disclosure of the structure in the patent’s specification, and the court’s focus was considering whether the disclosure was adequate.³

³ Plaintiff does not point the Court to any language in the specification of the 529 Patent describing the function of a rectifier.

Finally, in *Biomedino*, the Federal Circuit addressed the substance of Lightning Ballast's argument. 490 F.3d at 952-53. In *Biomedino*, the court considered the claim limitation "control means" and whether the patent's specification disclosed a corresponding structure. *Id.* at 948-49. The only references in the specification to the "control means" were a box labeled "Control" in a diagram of the invention and a statement that the regeneration process "'may be controlled automatically by known differential pressure, valving and control equipment.'" *Id.* at 949. The appellant relied on expert testimony to show that from the above statement, one skilled in the art would be able to identify a structure.⁴ *Id.* at 951. The court rejected this argument, stating that the proper inquiry was not whether a person skilled in the art could implement a structure but whether that person would *understand the specification to disclose a structure*. *Id.* at 953 (emphasis added). Thus, the *Biomedino* court held that the "bare statement that known techniques or methods can be used does not disclose structure." *Id.*

Here, Lighting Ballast fails to point the Court to any language in the 529 Patent that discloses either implicitly or explicitly the structure of a rectifier. Rather, Lighting Ballast attempts to use testimony from the inventor, Bobel, and an expert, Dr. Roberts, that they understand that the invention covered by the 529 Patent would require a rectifier. In so doing, Lighting Ballast finds itself in same position as the appellant in *Biomedino*, arguing that one skilled in the art could implement a structure. Lighting Ballast relies on the testimony of Bobel and Dr. Roberts, that they, as persons skilled in the art of lighting ballasts, understand that when the specification speaks of using a DC supply voltage, where power is supplied from a power line source, which they know to supply AC voltage, that a structure to convert AC power to DC

⁴ Similar to Dr. Roberts's argument in this case, *see supra* n2 and *infra* n6.

Case 7:09-cv-00029-O Document 101 Filed 08/19/10 Page 17 of 19 PageID 877

power would be required. Furthermore, since the invention is a lighting ballast, Dr. Roberts testifies, a rectifier would be the structure used in the vast majority of applications. While all of this may be true, it ignores the proper inquiry laid out by the Federal Circuit in *Atmel* and further explained in *Biomedino*. First, Lighting Ballast must point the Court to the disclosure of a corresponding structure in the specification, and only then, may the Court evaluate the sufficiency of the disclosure and determine whether one skilled in the art would understand the disclosure to suggest the corresponding structure. *See Atmel*, 198 F.3d at 1381.

Since Lighting Ballast is unable to point the Court to language in the specification disclosing a structure, it seeks to rely on expert testimony that one skilled in the art is capable of implementing a structure after reading the specification.⁵ However, the Federal Circuit, in *Biomedino*, expressly forbids such use of expert testimony. *Biomedino*, 490 F.3d at 953. At most, the language in the specification to which Lighting Ballast directs the Court requires an inference on the part of one skilled the art who has read the 529 Patent. The references to a power line source and a DC supply voltage do not connote structure; rather they require the person skilled in the art to implement one.⁶ Therefore, the Court finds that Plaintiff, Lighting Ballast, has failed to identify a structure in the 529 Patent's specification that corresponds to the "voltage source means" limitation, contrary the requirements of 35 U.S.C. § 112, ¶ 6.

IV. CONCLUSION

⁵ The Court notes that in its briefing, Plaintiff admits that the 529 Patent focuses on the energy output rather than the energy input side of the ballast. Pl.'s Opening Br. Cl. Const. 4, n.4, ECF No. 84. This may explain the absence of any disclosure of a structure to match the "voltage source means" limitation in Claims 1 and 18.

⁶ Dr. Roberts only bolsters this conclusion in his declaration when he states: "one skilled in the art would immediately ascertain and implement the structure necessary to supply the DC supply voltage, based on the particular application of the ballast in question." Pl.'s Opening App. Ex. 3 at 8, ECF No. 84-7 (emphasis added); see also n2 *supra*.

A determination that a claim is indefinite is a question of law and is part of the court's duty as the construer of patent claims. *Personalized Media Commc'ns*, 161 F.3d at 705. It is well-established that the determination of whether a claim is invalid as indefinite depends on whether one skilled in the art would understand the scope of the claim at issue when it is read in light of the specification. *North Am. Vaccine, Inc. v. American Cyanamid Co.*, 7 F.3d 1571, 1579 (Fed. Cir. 1993). Where one employs means-plus-function language in a claim, one must set forth, in the specification, an adequate disclosure showing what is meant by the claim language. *Atmel*, 198 F.3d at 1378-79 (quoting *In re Donaldson Co., Inc.*, 16 F.3d 1189, 1195 (Fed. Cir. 1994)). If an applicant fails to set forth an adequate disclosure of the structure intended by the claim language, the applicant fails to "particularly point out and distinctly claim the invention," as required by section 112, ¶ 2. *Id.* at 1379. In order for a claim to meet the particularity requirements of section 112, ¶ 2, the corresponding structure of a means-plus-function limitation must be disclosed in the written specification. *Id.* at 1382. Where a patent specification fails to disclose a corresponding structure for a means-plus-function limitation in a claim, that claim is invalid for indefiniteness under section 112, ¶ 2. *See id*; *see also Default Proof Credit Card Sys., Inc. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1302-03 (Fed Cir. 2005)..

The Court has held that the "voltage source means" limitation, present in both Claims 1 and 18, is a means-plus-function limitation, subject to construction under section 112, ¶ 6. Applying section 112, ¶ 6 the Court found that the specification of the 529 Patent fails to disclose a corresponding structure for the "voltage source means." Therefore, since the 529 Patent fails to disclose a structure for a means-plus-function limitation in a claim, those claims, Claims 1 and 18, are indefinite under section 112, ¶ 2 because they fail to particularly point out

Case 7:09-cv-00029-O Document 101 Filed 08/19/10 Page 19 of 19 PageID 879

and distinctly claim the subject matter which the applicant regards as his invention. *See Atmel*, 198 F.3d at 1379; *Default Proof Credit Sys.*, 412 F.3d at 1302-03. Accordingly, the Court finds that Claims 1 and 18 are invalid for indefiniteness and may not be enforced by Lighting Ballast against Universal.

While the parties present other claim terms and limitations from Claims 1 and 18 for construction the Court need not reach them due to the invalidity of both claims.

Signed this 19th day of August, 2010.


Reed O'Connor
UNITED STATES DISTRICT JUDGE

**MOTION FOR RECONSIDERATION RE 101 MEMORANDUM OPINION AND
ORDER, AND CLARIFICATION, AND REQUEST FOR EXPEDITED HEARING
FILED BY LIGHTING BALLAST CONTROL (DKT 102)**

to this conclusion, Plaintiff uses the recited function along with inventor and expert testimony . . .
." Op. at 11 (emphasis added). But again, the Federal Circuit has endorsed this approach, as it is
the best way to determine what the claim language conveys to one skilled in the art. *See M.I.T.*,
462 F.3d at 1355-56 (majority op.) and 1363-64 (Michel, C.J., dissenting).

Then, the Court discounts or misconstrues the unchallenged expert testimony of
record. For example, the Court states:

Lighting Ballast does not point the Court to any evidence, intrinsic or extrinsic,
that the term "voltage source" is commonly used in the electronic ballast industry
to mean a rectifier[,] ... [and t]here is no indication that "voltage source" is often
used synonymously with the term "rectifier" by those of ordinary skill in the
electronic ballast industry.

Op. at 11-12. It is true that Dr. Roberts and Mr. Bobel did not use the magic word
"synonymous." But Msrs. Roberts and Bobel went further than that, stating that a rectifier is *the*
only thing that a lighting ballast would ever use to convert AC from the power line into DC:

The "voltage source" limitation connotes, or suggests, to me, and would connote
to anyone skilled in the art, the structure of a rectifier with its input terminals
connected to an AC power line and with its output terminals connected to the DC
input terminals. In other words, the only way for a lighting ballast to convert AC
into DC . . . is through a rectifier . . . AC power is converted into DC power
through the use of a rectifier . . . The only structure in a lighting ballast that can
perform [this] function is a rectifier.

Roberts Dec. (Dkt. No. 84-7) at 7-8. Similarly, Bobel testified that the voltage source limitation
connotes the structure of a rectifier to anyone skilled in the art, and he explained that *in every*
instance where a lighting ballast converts AC to DC, it does so through the use of a rectifier.

Bobel Depo. (Dkt. No. 84-3) at 226-34; *see also* Pl.'s Opening Br. (Dkt. No. 84) at 15.

The Court even concedes that the claim language "refers . . . inferentially to the function
of a rectifier" (Op. at 12) but nevertheless concludes that this is insufficient to connote structure
to one skilled in the art, even in the face of unchallenged expert testimony to the contrary. Such
a conclusion runs counter to Federal Circuit precedent, including *M.I.T.* and *Linear Tech.*

**ORDER STAYING ALL DEADLINES PENDING RULING ON
MOTION FOR RECONSIDERATION (DKT 106)**

From: ecf_txnd@txnd.uscourts.gov
Sent: Friday, October 29, 2010 11:22 AM
To: Courtmail@txnd.uscourts.gov
Subject: Activity in Case 7:09-cv-00029-O Lighting Ballast Control LLC v. Advance Transformer Co. et al Order

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U.S. District Court

Northern District of Texas

Notice of Electronic Filing

The following transaction was entered on 10/29/2010 at 10:22 AM CDT and filed on 10/29/2010

Case Name: Lighting Ballast Control LLC v. Advance Transformer Co. et al

Case Number: 7:09-cv-00029-O

Filer:

Document Number: 106(No document attached)

Docket Text:

ELECTRONIC ORDER: Pending the Court's resolution of Plaintiff's Motion for Reconsideration, ECF No. [102], all pending deadlines are vacated. (Ordered by Judge Reed C O'Connor on 10/29/2010) (chmb) (acc)

7:09-cv-00029-O Notice has been electronically mailed to:

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**BRIEF IN SUPPORT OF DEFENDANT UNIVERSAL LIGHTING TECHNOLOGIES,
INC.'S MOTION FOR SUMMARY JUDGMENT OR PARTIAL SUMMARY
JUDGMENT (DKT 127)**

A943 – A999 REMOVED DUE TO CONFIDENTIAL MATERIAL

A1006 – A1009 REMOVED DUE TO CONFIDENTIAL MATERIAL

A1173 – A1195 REMOVED DUE TO CONFIDENTIAL MATERIAL

A1238 – A1258 REMOVED DUE TO CONFIDENTIAL MATERIAL

A1386 – A1447 REMOVED DUE TO CONFIDENTIAL MATERIAL

A1567 – A1631 REMOVED DUE TO CONFIDENTIAL MATERIAL

A1719 – A1738 REMOVED DUE TO CONFIDENTIAL MATERIAL

**LBC'S RESPONSE TO MOTION FOR SUMMARY JUDGMENT AND
MEMORANDUM IN SUPPORT THEREOF (DKT 135)**

A2854 – A2906 REMOVED DUE TO CONFIDENTIAL MATERIAL

**LBC'S REPLY ISO MOTION FOR LEAVE TO FILE SURREPLY IN FURTHER
SUPPORT OF OPP TO ULT'S MSJ (DKT 145)**

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION

LIGHTING BALLAST CONTROL LLC,

Plaintiff,

v.

UNIVERSAL LIGHTING TECHNOLOGIES,
INC.,

Defendant.

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CIVIL ACTION NO. 7:09-CV-00029-O

JURY TRIAL DEMANDED

**PLAINTIFF'S REPLY IN SUPPORT OF ITS MOTION FOR LEAVE
TO FILE SUR-REPLY IN FURTHER SUPPORT OF ITS OPPOSITION TO
DEFENDANT'S MOTION FOR SUMMARY JUDGMENT**

INTRODUCTION

ULT has launched an aggressive assault against LBC's expert, Dr. Victor Roberts, under the guise of a Response to LBC's Motion for Leave, but it offers little to explain its untimely evidentiary submissions. LBC has simply requested a brief opportunity to respond, via a sur-reply, to the new evidence and arguments presented for the first time in ULT's summary judgment reply brief.

I. ULT's attacks on Dr. Victor Roberts are misplaced.

ULT has yet to present any record evidence to rebut LBC's charges of discovery misconduct. Instead, it has turned its fire on Dr. Victor Roberts. This is unfortunate.

Dr. Roberts is eminently qualified in his field and, at nearly seventy years of age, has established a reputation of the utmost honesty and integrity. ULT's attempt to impugn his character is unfair and misguided. Dr. Roberts has devoted substantial time to this case in an effort to carefully, accurately, and truthfully present his infringement opinions. Those efforts

ultimately culminated in a detailed expert report, detailed infringement charts, and detailed supplements to the initial report. And Dr. Roberts was deposed on February 18, 2011 for more than eleven hours – a deposition that created a written transcript in excess of 450 pages.

It is no surprise that a 450-page transcript filled with highly technical terms would require corrections, and the vast majority of Dr. Roberts' changes were limited to typical errors, such as transcription and spelling issues. In addition, with respect to answers given in response to vague and objectionable deposition questions that could potentially impact the Court's construction of the disputed "whenever . . . defective" clause of Claim 1, ULT refused to specify in many of its questions whether it was referring to lamp "defects" and "fault conditions" as those terms are understood generally (*i.e.*, in the abstract), or whether it was referring to how those terms are understood, for example, in the context of the patent's '529 Patent as a whole, in the context of the preferred embodiment, or in the context of specific limitations within the patent claims. ULT persisted with such questions, despite repeated objections from LBC. *See, e.g.*, Dkt. 134 at 5-8 (showing some of LBC's objections to ULT's imprecise questions). Dr. Roberts' small handful of changes on this point simply clarified his position in a manner that was consistent with his expert report and with other testimony provided during his deposition.

In any event, Dr. Roberts was legally entitled to review his transcript for any errors:

On request by the deponent . . . , the deponent must be allowed 30 days . . . in which: (A) to review the transcript . . . ; and (B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

Fed. R. Civ. P. 30(e). He received his transcript on February 24, 2011, and his errata sheet was therefore due on March 28, 2011. Dr. Roberts complied with the rule and swore to the truthfulness of his changes. *See* Dkt. 140-1 at A-877 (showing that Dr. Roberts' errata sheet was timely completed and executed on March 19, 2011 and was attached to LBC's proposed sur-

reply on March 21, 2011). ULT's complaints are therefore misplaced. *See Global Mach. Tech. v. Thomas C. Wilson, Inc.*, 2003 U.S. Dist. LEXIS 27593, *15 (S.D. Tex. Sept. 17, 2003) (denying motion to strike errata sheet, stating: "[T]he court finds no authority within the rule to deny a deponent the opportunity to make such changes, provided proper procedures were followed. The rule does not place any responsibility on the district judge to approve the changes made by deponents."); *Innovative Mktg. & Tech., L.L.C. v. Norm Thompson Outfitters*, 171 F.R.D. 203, 205 (W.D. Tex. 1997) (denying defendants' motion to strike errata sheet, explaining that a construction of "rule 30(e) [that] only allows the correction of stenographer/court reporter typographical errors . . . seems too narrow"). Rule 30(e) is broadly worded and should be broadly interpreted, as many courts have emphasized. *See, e.g., Medina v. Horseshoe Entm't*, 2006 U.S. Dist. LEXIS 49137, *10 (W.D. La. July 19, 2006) ("Under the broad interpretation of Rule 30(e), . . . substantive alterations are permitted."); *Reilly v. TXU Corp.*, 230 F.R.D 486, 490 (N.D. Tex. 2005) (plaintiff entitled to correct deposition, and defendants permitted to cross-examine), *rev'd on other grounds*, 271 Fed. Appx. 375 (5th Cir. 2008); *Agrizap, Inc. v. Woodstream Corp.*, 232 F.R.D. 491, 493 n.2 (E.D. Pa. 2006) (citing numerous courts who properly understand "Rule 30(e) to permit the deponent to make any kind of changes (corrections based on a claim of transcription error, or any other substantive or procedural changes)."); *see also* 8A Wright, Miller & Marcus, FEDERAL PRACTICE AND PROCEDURE, § 2118 at 134 (1994).

ULT is welcome to cross-examine Dr. Roberts at trial on the corrections and clarifications noted in his errata sheet. But it should not be allowed to drag his good name through the mud.

PROPOSED JURY CHARGE FILED BY LBC (DKT 171)

If you find that Defendant's products include all of the elements of Claim 1, the fact that Defendant's products might include additional components would not avoid infringement of a claim that uses "comprising" language.

"CLAIM CONSTRUCTION"

I have construed or interpreted certain of the terms of the asserted claims to have the following meanings, which you should accept and apply in deciding this case:

As used in the Preamble of Claim 1, the phrase "oscillating resonant converter producing oscillations" is defined as "a circuit, or portion of a circuit, containing inductance, capacitance, and at least one electronic switching device (such as a transistor) that operates to convert direct current into alternating current."

As used in the Preamble of Claim 1, the phrase "DC input terminals" is defined as "terminals for receiving a DC supply voltage." The phrase "producing a control signal" is defined as "serving as the origin of direct current that travels along a direct current path from the DC input terminals, through the filament or filaments, and to an input terminal of the control means, but which does not pass through the DC blocking means." This control signal from the DC input terminals is sometimes referred to as the "DC control signal."

As used in Element A of Claim 1, the phrase "voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals" shall be understood in accordance with its ordinary meaning to one of ordinary skill in the field, when read in the context of the patent's claims and specification.

As used in Element D of Claim 1, the phrase "whenever at least one gas discharge lamp is removed from the output terminals or is defective" shall be given its ordinary meaning as

understood by one of ordinary skill in the filed, when read in the context of the patent's claims and specification.

Some of the requirements of Claim 1 are written in a different format called "means-plus-function," which I will now explain.

MEANS-PLUS-FUNCTION CLAIMS

Along with the terms I just described, there are certain claim requirements that are written in what is called "means-plus-function" format, including the "control means" requirement and the "direct current blocking means" requirement. The patent laws permit requirements of a claimed invention to be expressed simply as a "means" or "way" for performing a certain function, without reciting in the claim the physical structure that actually performs the claimed function. Such "means-plus-function" requirements do not cover all of the structures that could perform the function set forth in the claim. Instead, they cover only the structure disclosed in the patent's specification to perform the claimed function and equivalents of that disclosed structure. The issue of whether two structures are identical or equivalent is for you to decide. I will explain to you later how to determine whether two structures are "equivalent" to one another. I have identified the structures described in the '529 patent that perform the functions recited in the means-plus-function requirements. You should apply my definitions of the functions and the structures described in the '529 patent for performing those functions, just as you must apply my definitions of any other claim terms.

There are two claim requirements in Claim 1 that use the means-plus-function format. The first requirement that is written in means-plus-function format is "control means capable of receiving control signals from the DC input terminals and from the resonant converter, and

**MOTION FOR CLARIFICATION OR RECONSIDERATION IN PART OF THE
SUMMARY JUDGMENT ORDER AND REQUEST FOR EXPEDITED TREATMENT
(DKT 176)**

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION

LIGHTING BALLAST CONTROL LLC,

Plaintiff,

v.

UNIVERSAL LIGHTING TECHNOLOGIES,
INC.,

Defendant.

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CIVIL ACTION NO. 7:09-CV-00029-O

JURY TRIAL DEMANDED

**MOTION FOR CLARIFICATION OR RECONSIDERATION IN PART OF THE
SUMMARY JUDGMENT ORDER AND REQUEST FOR EXPEDITED TREATMENT**

ULT respectfully moves for clarification or reconsideration of one aspect of the construction of the “direct current blocking means” term adopted by the Court in its recent *Summary Judgment Order* [Dkt. #172] as well as the Court’s denial of summary judgment that the JP ‘099 prior art reference anticipates claim 1 of the asserted ‘529 patent. ULT further requests that briefing on this motion be expedited so that the motion can be ruled on as soon as possible to permit the parties to prepare for trial beginning June 6, 2011. A brief in support of the motion and a proposed order are being submitted herewith.

CERTIFICATE OF CONFERENCE

This motion is opposed. On the afternoon of Friday, May 6, 2011, Steven Routh, counsel for ULT discussed this motion and the bases therefor with Mr. Jonathan Suder and Mr. David Skeels, counsel for LBC. Counsel for LBC indicated that they would oppose the relief requested.

Dated: May 9, 2011

Respectfully submitted,

/s/ Deborah L. Sterling

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Attorneys for Defendant

Universal Lighting Technologies, Inc.

**ULT'S OPP TO LBC'S EMERGENCY MOTION FOR RECONSIDERATION AND
CLARIFICATION OF SUMMARY JUDGMENT ORDER (DKT 179)**

A4951 – A4973 REMOVED DUE TO CONFIDENTIAL MATERIAL

A4986 – A5001 REMOVED DUE TO CONFIDENTIAL MATERIAL

**LBC'S RESPONSE TO ULT'S EMERGENCY MOTION FOR CLARIFICATION OR
RECONSIDERATION [ECF. 177] (DKT 184)**

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION

LIGHTING BALLAST CONTROL LLC,	§	
	§	
Plaintiff,	§	CIVIL ACTION NO. 7:09-CV-00029-O
	§	
v.	§	JURY TRIAL DEMANDED
	§	
UNIVERSAL LIGHTING TECHNOLOGIES,	§	
INC.,	§	
	§	
Defendant.	§	

**PLAINTIFF'S RESPONSE TO DEFENDANT'S EMERGENCY MOTION FOR
CLARIFICATION OR RECONSIDERATION [ECF NO. 177]**

INTRODUCTION

ULT has filed no less than six briefs in which it has argued its claim construction positions, yet it has once again failed to submit any evidence from one skilled in the art to support its position. ULT operates in the very lighting ballast business to which the '529 Patent is directed and has designated 19 technical experts that it claims are skilled in the art and understand the teachings of the '529 Patent. Despite this, as the record currently stands, LBC's technical evidence on the points raised herein remains undisputed. As such, it was properly considered and adopted by the Court in its December claim construction ruling and in its Summary Judgment Order. That ruling should not be disturbed.

In construing the DC blocking means limitation, the Court has specified as corresponding structure, specific capacitors that are designated in the '529 Patent as capacitors 08 and 25. In Figure 1 of the '529 Patent, these DC blocking capacitors collectively form the DC blocking means, which is operable to stop the flow of the DC control signal whenever the DC control path is broken. In its attempt to avoid a trial on the merits, ULT now takes the position that "any

Case 7:09-cv-00029-O Document 184 Filed 05/18/11 Page 2 of 10 PageID 5356

capacitor will do,” regardless of its purpose and regardless of where it is placed in the circuit, so long as it is connected in some way to the output terminals. This position is inconsistent with the plain teachings of the patent and the prior positions of the parties.

The ‘529 Patent teaches a circuit with multiple types of capacitors that, to one skilled in the art, serve various purposes. ULT recognized this fact during claim construction when it proposed as corresponding structure capacitors “08 and 25” to distinguish them from other capacitors shown in the figures and discussed in the specification. These capacitors have been referred to as the “DC blocking capacitors” and, until now, the parties had agreed that these capacitors are distinct from other capacitors in the circuit. ULT has now abandoned this position in the hopes of salvaging its invalidity argument.

For the first time, and without any evidentiary support, ULT presents a new invalidity theory based entirely on attorney argument. Specifically, ULT has identified in the JP ‘099 schematic a host of random and unrelated capacitors and has declared that these capacitors satisfy the DC blocking means limitation. There is no support for this position. The *only* DC blocking capacitor that is coupled to a set of output terminals in the JP ‘099 reference is capacitor C12 – a point on which ULT’s expert, Dr. Giesselmann, and LBC’s expert, Dr. Zane agree.

The Court’s Summary Judgment Order was sound in its reasoning, correct in its holding, and fully supported by the Summary Judgment record. ULT’s Motion, devoid of any evidentiary support, must be denied.

I. The Court’s Ruling Was Clear and Correct

ULT suggests that the Court’s construction of the DC blocking means limitation is confusing and internally inconsistent. To make this argument, ULT continues to exhibit a flawed

understanding of the limitation by speaking in terms of whether or not each set of output terminals is associated with its own, individual DC blocking means. *See e.g.*, ECF No. 177 at 2-3, 6. To the contrary, the Court's claim construction ruling is consistent with the plain language of the claim, and, when properly understood, harmonizes the teachings of the specification with the express requirements of the claim to resolve all of the concerns raised by ULT.

The claim requires DC blocking means that accounts for (or is "coupled to") each set of output terminals. The DC blocking *means* is comprised of multiple DC blocking *circuits* (or DC blocking *capacitors*). By accounting for each set of output terminals, the DC blocking means assures that the DC control signal will be stopped when a lamp is removed or defective – regardless of whether or not the signal passes through every set of output terminals. Despite numerous opportunities to do so, ULT never challenged LBC's experts on this point. *See e.g.*, LBC's Response to Summary Judgment, ECF No. 135 at 24. ULT is now trying to obfuscate the point to argue that somehow Claim 1 does not require a DC blocking capacitor coupled to each set of output terminals and, further, even if Claim 1 does so require, *any* capacitor, regardless of its purpose or placement, serves to meet this limitation so long as it is connected in some way to an output terminal.

To support its argument, ULT calls attention to Figure 5 of the '529 Patent because it is the only figure that does not have a capacitor or diode coupled to each set of output terminals. Figure 5 is described in Column 5, Lines 66-68 of the '529 Patent as "a fragmentary illustration in variation of circuit 400 in Figure 4" and does not discuss DC blocking capacitors. What ULT ignores is that Claims 1-5 are most closely associated with the embodiments shown in Figures 1-3, while the specification's discussion of Figures 4-7 is most closely associated with Claims 6-

Case 7:09-cv-00029-O Document 184 Filed 05/18/11 Page 4 of 10 PageID 5358

17, all of which require “one-shot trigger means” and “one-shot disable means.” Claims 6-17 are not and have never been at issue in this lawsuit.

ULT also argues that Figure 5 represents *the* preferred embodiment. ECF No. 177 at 6. This is not true. Figure 5 represents but one of several embodiments, and the patent laws do not require every embodiment to be covered by a claim. *Gen. Atomics Diazyme Labs. Div. v. Axis-Shield ASA*, 277 Fed. Appx. 1001, 1008 (Fed. Cir. 2008) (“some embodiments are covered in a patent and others are not”). Finally, the Federal Circuit has repeatedly held that it is improper to import limitations from the embodiments disclosed in the specification to limit or otherwise vary the meaning of the claim language. *See Liebel-Flarschein v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004). ULT ignores this bedrock principle by attempting to import the embodiment of Figure 5 into the language of Claim 1.

The bottom line is that after careful consideration and extensive briefing by both sides, the Court got it right.

II. JP ‘099 Does Not Anticipate Claim 1

In its Amended Claim Construction Order, the Court’s Conclusion section described the corresponding structure for the DC blocking means limitation as: “A capacitor or diode within the control circuit, as set forth *supra* in Part III (F)(3).” ECF No. 107 at 33-34 (emphasis added). ULT ignores the emphasized language. In Part III (F)(3) of its opinion, the Court specifically identified the corresponding structure by reference to Column 3, lines 53-58, which, in turn, describe DC blocking circuits that include capacitors 08 and 25. The Court was not referring to just *any* capacitor in the control circuit. ECF No. 107 at 27-31, 33-34. ULT seizes on the first part of the Court’s Conclusion sentence (“a capacitor or diode within the control circuit”) but ignores the second part (“as set forth *supra* in Part III (F)(3)”) to argue that *any*

to their numeric labels, LBC has always identified the same capacitors but has chosen to describe them by reference to how they are connected in the circuit, as described in the preferred embodiment.²

By suggesting during claim construction that a DC blocking capacitor may be defined, and may be distinguished from other capacitors in the circuit, by reference to its series connection with a secondary winding, LBC was seeking to more specifically identify the corresponding structure and to thereby clarify that the limitation may only be satisfied by particular capacitors and not just by *any* capacitors. Thus, LBC was advocating for a *narrower*, not a *broad*er, construction. In this regard, LBC agrees with the Court and with the Federal Circuit in *Alloc v. International Trade Commission* that “the scope of a patent’s claims may not be broader than the specification’s characterization of the invention.” See Amended Memorandum Opinion and Order [ECF No. 107] at 29. At the same time, LBC respectfully submits that a clearer way to distinguish these specific DC blocking capacitors from other capacitors that serve different purposes is by reference to their series connection with a secondary winding.³

Dr. Giesselmann, ULT’s technical expert on validity issues, failed to identify any capacitors analogous to 08 and 25 other than capacitor C12 in his analysis of the JP ‘099 reference:

² ULT will no doubt argue in its reply that LBC is arguing for reconsideration of its claim construction position on this point. This is not true. To the contrary, LBC recognizes that the corresponding structure requires capacitors or diodes. But the claim requires *specific* capacitors or diodes, and the easiest way to identify those DC blocking capacitors and to distinguish them from other capacitors is by reference to their description in the specification.

³ In the context of the ‘529 Patent, “DC blocking capacitor” may be considered a term of art used to distinguish between various types of capacitors, because all capacitors, by definition, block DC. See, e.g., ULT A455, A457 (wherein Dr. Giesselmann describes DC blocking capacitors, as distinct from resonant capacitors); see also ULT A483-A484 (wherein Dr. Zane distinguishes between “series DC capacitors,” “DC blocking capacitors,” and “resonant capacitors”).

Figure 2 of JP '099 illustrates a direct current blocking means C12, which operates to stop the flow of the control signal from the DC input terminals when filament f12 or f21 is removed from the output terminals or is defective. *See* Figure 2, JP '099. *See also* JP '099, 11:28-33 ("That is, a capacitor C12 is inserted into the preheating circuit including the preheating winding Wf...").

ULT A457. ULT never sought to supplement or update Dr. Giesselmann's opinion and does not do so now. LBC's expert, Dr. Zane, is in accord with Dr. Giesselmann's identification of C12 as the relevant capacitor. In addition, Dr. Zane explains that capacitors C4 and C5 in Fig. 2 of the '099 reference are resonant capacitors, not DC blocking capacitors, and that the DC blocking means limitation is not met because the alleged DC blocking means does not account for each set of output terminals. Specifically, in JP '099, there are no DC blocking capacitors coupled to the outer sets of output terminals. LBC A-552.

The Court properly relied on the expert testimony of record when it held that JP '099 fails to teach a DC blocking means that accounts for each set of output terminals. ECF No. 172 at 27. Now, without any further declaration from Dr. Giesselmann, ULT urges this Court to accept three *other* capacitors as supporting structure for this limitation. This is both procedurally and substantively improper and cannot be the basis for any sort of reconsideration, especially in the face of LBC's competent evidence, which to this day remains undisputed.⁴

In sum, ULT has not secured any evidence from any of its 19 experts to support its latest claim construction theory. Nor has it secured a declaration from Dr. Giesselmann regarding the capacitors it now alleges are relevant to this discussion. For this reason alone, ULT's attempt to invalidate the asserted claims of the '529 Patent must fail.

⁴ No doubt, ULT will attempt to submit a declaration in its reply, but the Court should reject out of hand such an attempt at this late stage.

PROPOSED JURY CHARGE FILED BY LBC (DKT 203)

DC input terminals producing a control signal and adapted to power at least one gas discharge lamp having heatable filaments, the device comprising:.”

If you find that Defendant’s products include all of the elements of Claim 1, the fact that Defendant’s products might include additional components would not avoid infringement of a claim that uses “comprising” language.

CLAIM CONSTRUCTION

I have construed or interpreted certain of the terms of the asserted claims to have the following meanings, which you should accept and apply in deciding this case:

As used in the Preamble of Claim 1, the phrase “oscillating resonant converter producing oscillations” is defined as “a circuit, or portion of a circuit, containing inductance, capacitance, and at least one electronic switching device (such as a transistor) that operates to convert direct current into alternating current.”

As used in the Preamble of Claim 1, the phrase “DC input terminals” is defined as “terminals for receiving a DC supply voltage.” The phrase “producing a control signal” is defined as “serving as the origin of direct current that travels along a direct current path from the DC input terminals, through the filament or filaments, and to an input terminal of the control means, but which does not pass through the DC blocking means.” This control signal from the DC input terminals is sometimes referred to as the “DC control signal.”

As used in Element A of Claim 1, the phrase “voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals” refers to “a rectifier.”²

LBC: As used in Element D of Claim 1, the phrase “whenever at least one gas discharge lamp is removed from the output terminals or is defective” is defined as

² See Amended Memorandum Opinion and Order [ECF No. 107] at 21-24.

There are two claim requirements in Claim 1 that use the means-plus-function format. The first requirement that is written in means-plus-function format is “control means capable of receiving control signals from the DC input terminals and from the resonant converter, and operable to effectively stop the oscillations of the converter.” **LBC:** This “control means” requirement recites four functions, as follows:

(1) control means

- (a) capable of receiving a control signal from the DC input terminals and;**
- (b) operable to effectively initiate the oscillations, and;**

(2) control means

- (a) capable of receiving a control signal from the resonant converter, and;**
- (b) operable to effectively stop the oscillations.**

The corresponding structure for the “control means” requirement is the control circuit (58) described at column 3, line 59 through column 4, line 21 of the ‘529 Patent.

ULT: This “control means” requirement recites three functions, each of which has a separate corresponding structure.

The first function of the “control means” is “capable of receiving control signals from the DC input terminals and from the resonant converter.” The corresponding structure to this function is the control terminal CTa of a control circuit, as defined at column 3, line 59 through column 4, line 21 of the ‘529 patent.

The second function of the “control means” is “operable to effectively initiate the oscillations.” The corresponding structures to this function are, to commence the start pulse, the diode 39, resistor 40, capacitor 42, and diac 44, and, to terminate the start pulse,

the diode 34, resistor 35, capacitor 38, resistor 37, and transistor 43, connected as described in the '529 patent.

The third function of the “control means” is to “effectively stop oscillations.” The corresponding structures to this function are the diode 29, resistor 30, resistor 32, capacitor 33, transistor 48 and diac 45, connected as described in the '529 patent.⁴

The second requirement of Claim 1 that uses the means-plus-function format is the “direct current blocking means” requirement. The claimed function of the “direct current blocking means” is “operable to stop the flow of the control signal from the DC input terminals, **ULT: whenever the direct current path between terminal B+ and terminal CTa is broken.**” The corresponding structure for this requirement is “a capacitor or diode connected to the heatable filament of the lamp.” LBC: whenever the DC control path through the filaments is broken due to lamp removal or a broken filament.” The corresponding structure for the

⁴ ULT's position: As set forth in this and the subsequent 3 paragraphs, ULT believes that the jury should be informed of the corresponding structures for each of the three functions in the “control means” requirement separately, as recognized and identified in the Court's claim construction opinion. See Def. Resp. Br. 7. Am. Mem. Op. and Order [ECF #107] at 24-26. The Court specifically recognized that the parties “agree on the structure corresponding to two of the functions, and it further noted that the parties “agree that the structures corresponding to the ‘effectively stop oscillations’ function are the diode 29, resistor 30, resistor 32, capacitor 33, transistor 48, and diac 45 connected as described in the 529 patent.” *Id.* Thus the Court has recognized that the three functions in the “control means” limitation have different corresponding structures, as set forth in the instructions proposed by ULT. ULT's proposed instruction faithfully follows the case law, including that cited by LBC, which states that the specification must identify corresponding structure for each recited function of a means plus function limitation. There is no dispute that the “control means” term includes different functions, each of which has a corresponding structure.

LBC's opposition: LBC's proposed language carefully tracks the Court's orders, including the Summary Judgment Order [ECF No. 172] at 8. The Court's rulings are consistent with the patent specification, which describes a control circuit for the preferred embodiment at Col. 3, line 59 through Column 4, line 21. Am. Mem. Op. and Order [ECF #107] at 26 (“the specification of the '529 Patent discloses a structure, namely a control circuit, at column 3, line 59 through column 4, line 21”). This control circuit serves as the corresponding structure for the control means limitation of Claim 1. Defendant's attempt to further granulate this instruction is confusing and unnecessary, and it flies in the face of Federal Circuit case law, which mandates a focus on the overall structure. *Odetics Inc. v. Storage Tech. Corp.*, 185 F.3d 1259, 1268 (Fed. Cir. 2000) (“[T]he claim limitation is the overall structure corresponding to the claimed function.”).

“direct current blocking means” requirement is as follows: “DC blocking capacitors (08 and 25) connected to the heatable filaments of the lamp.”⁵

All other words of the claims have their plain and ordinary meanings, as those words would be understood by a person of ordinary skill in the field, when read in the context of the patent specification and claims. I will now instruct you on what is meant by a person of ordinary skill in the art.

LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art is a person with a specific level of education, training, and experience in the field such that they understand what is being taught by a patent based on such background. It is up to you to decide the level of ordinary skill in the field of the invention. You should consider all of the evidence introduced at trial in making this decision, including: the educational level and experience of people working in the field, the types of problems faced by workers in the field and the solutions found for those problems, and the sophistication of the technology in the field.

Plaintiff contends that, for this case, the hypothetical person of ordinary skill in the

⁵ ULT: Regarding the “whenever” clause, ULT relies on *Summary Judgment Order* at 17. Regarding the corresponding structure, ULT uses the language from the Court’s Amended Claim Construction Order [ECF #107]. ULT sees no reference in the claim construction order to “capacitors 08 and 25” and in addition, the Order states that the corresponding structure for claim 1 can be a capacitor or diode, whereas LBC’s new proposal limits the structure to capacitors only.

At literally the eleventh hour (approximately 10:45 PM on the night the jury charge was to be filed), LBC added the sentence “

LBC: Regarding the “whenever” clause, LBC’s proposed language tracks, word for word, the Court’s summary judgment ruling. ECF No. 172 at 15 (LBC’s construction . . . focuses on the DC control path: the DC blocking means is operable to stop the flow of the DC control signal whenever the DC control path through the filaments is broken due to lamp removal or a broken filament. The Court agrees with LBC and adopts its proposed construction.”). Regarding the corresponding structure, ULT completely ignores the Court’s reference to “529 Patent, col. 3, ll. 53-58,” which specifies capacitors 08 and 25. Amended Memorandum and Order [ECF No. 107] at 27, 33-34. ULT also ignores the fact that it previously advocated for a construction that specifically identified capacitors 08 and 25 as the corresponding structure for the DC blocking means limitation. *See* ECF 184 at 4-7 and n.2, n.3.

Section No. II – Questions Regarding Invalidity

If you have answered “NO” to all of Question 1 you do not need to consider the questions below. If you have answered “YES” to any part of Question 1, then for each claim that you have entered such an answer, you must respond to the questions below.

QUESTION NO. 2 – ANTICIPATION

LBC: Do you find by clear and convincing evidence that any of the following claims of the '529 Patent are invalid as anticipated? Answer “YES” or “NO” as to each.⁴²

Claim 1 of the '529 Patent _____

Claim 2 of the '529 Patent _____

Claim 5 of the '529 Patent _____

ULT: Do you find by clear and convincing evidence that any of the following claims of the '529 Patent are invalid as anticipated? Answer “YES” or “NO” as to each reference and each claim:

Prior Art Reference	Claim 1	Claim 2	Claim 5
JP '099⁴³:			
JP '997:			

⁴² For the reasons previously stated, LBC objects to all of ULT's Japanese references and notes that the claims of the '529 Patent were allowed in the face of the '682 Patent. Regardless of the number of prior art references admitted, LBC contends that this is a simpler and cleaner way to present the question of anticipation. Even if ULT's proposed format is adopted, the JP '099 reference should not be included in the anticipation question because the Court already ruled, as a matter of law, that JP '099 does not and cannot anticipate Claim 1; therefore it does not and cannot infringe Claims 2 or 5, which depend therefrom. *See* Summary Judgment Order [ECF No. 172] at 27-28.

ULT's position: Asking the jury to specify which prior art references anticipate each of the claims will clarify the verdict and the bases for the jury's decisions. As to JP '099, LBC did not ask for, and the Court did not grant, summary judgment in favor of LBC on any part of ULT's invalidity defense. *See Summary Judgment Order*. Denial of ULT's motion for summary judgment as to JP '099 based on the Court's acceptance of LBC's expert witness's testimony “for purposes of summary judgment” (*Summary Judgment Order* at 24) is not a ruling as a matter of law that JP '099 cannot anticipate. LBC will make infringement arguments that are irreconcilably inconsistent with its validity arguments, and ULT will present evidence and argument at trial on that point.

⁴³ *See* previous footnote.

TRIAL BRIEF ON CONNECTED TO LANGUAGE BY LBC (DKT 232)

Case 7:09-cv-00029-O Document 232 Filed 06/16/11 Page 1 of 12 PageID 5925

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION

LIGHTING BALLAST CONTROL LLC,

Plaintiff,

v.

UNIVERSAL LIGHTING TECHNOLOGIES,
INC.,

Defendant.

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CIVIL ACTION NO. 7:09-CV-00029-O

JURY TRIAL DEMANDED

PLAINTIFF'S TRIAL BRIEF ON ISSUE OF "CONNECTED TO" LANGUAGE

I. Introduction

ULT's 11th hour interpretation of Claim 1 is incorrect and inconsistent with how experts in the field understand this claim term. As the Court has observed in this case, **terms are to be understood as they would be by those of skill in the art.** Here, all those skilled in the art are in agreement on the issue. Perhaps, the best evidence of this fact is ULT's own '652 Patent.

As the parties and the Court have agreed throughout the course of this litigation, "The 529 Patent covers a *lighting ballast* . . . that powers florescent lamps with heatable filaments." ECF No. 107 at 2 (emphasis added). Specifically, in its Claim Construction Order, the Court recognized that Claims 1 and 18 were substantially the same, based on the parties' agreement on the topic. This point was never disputed by either side. In fact, even in the Defendant's Opening Claim Construction Tutorial, demonstrates ULT's agreement with the Court's understanding and the fact it does not require a physically

Case 7:09-cv-00029-O Document 232 Filed 06/16/11 Page 8 of 12 PageID 5932

entertain ULT's new construction. But the claims do not say that. LBC's proposed construction is the only reasonable interpretation.

2. The Language of the Patent Description and Claims Supports a Reading that Only a Ballast is Required

Both the '529 patent description and Claims 6 -17 support the preamble's teaching that the device refers only to a lighting ballast. The preamble for all of the independent claims is the same. Within the description, the patent refers to each of the embodiments as a "circuit" *"for powering a fluorescent lamp."* See Joint Exhibit 1, Col 3, ln 4-5; Col. 4, ln.24; Col. 4, ln 53-54 (emphasis added). The circuit mentioned throughout the description does not require a lamp to be connected to the energy conversion device. See Col. 3 – Col. 7. This claim language mirrors the requirements in the preamble limitation and describes a lighting ballast that has the capability of being linked to a gas discharge lamp.

C. The '529 File History Demonstrates the "For Connection To" Language Was Not Disclaimed to Avoid Prior Art

ULT argues that the change in Claim 1's language from "for connection to" to "connected to" demonstrates an intentional change in the file history and thus the claim should be treated differently from the rest of the patent. However, a close look at the office action and response involving Claim 1's "connected to" language show that the change was not necessary to distinguish from prior art and was cosmetic in nature.

In the Office Action issued during the '529 Patent's examination, Claim 1 was rejected as anticipated by Zuchtriegel as teaching control means and direct current blocking means. Bobel responded to this action and noted that Zuchtriegel does not disclose a "specific control means" and that "direct current blocking means" were not

taught. The Court recognized this in its Summary Judgment Order. ECF No. 172 at 11-12.

The examiner did not reject Claim 1 on the basis of the “output terminals” language. The examiner noted that:

Zuchriegel shows in a operating circuit for fluorescent lamps (see figure 1): voltage source means 2, output terminals (connected to the lamp in the figures), control means 5, and DC blocking means C (see column 4 lines 27-42 which details this capacitors function with regard to the disconnection and reconnection of the lamp load LP1.

Joint Exhibit 2, pg. 93.

Mr. Bobel has never claimed to have invented output terminals, nor has there ever been a contention this is a novel feature of the ‘529 Patent; rather, it is merely a point of connection on a schematic in order to demonstrate where current flows to the lamp. Mr. Bobel further explained this point that a voltage source means and output terminals were basic parts of any electronic ballast and part of the claim to set up the heart of his invention – the combination of a new control means and DC blocking means. This topic was the driving discussion in the ‘529 Office Action; not the claim language surrounding “connected to.”

D. The Combination of the Written Description and Prosecution History Justify Coalescing The Terms to Cover the Same Subject Matter

When different words or phrases are used in separate claims, a difference in meaning is presumed. *Nystrom v. Trex Co.*, 424 F.3d 1136, 1143 (Fed. Cir. 2005) However, “different terms or phrases in separate claims may be construed to cover the same subject matter where the written description and prosecution history indicate that such a reading of the terms of phrases is proper.” *Id.* (quoting *Tandon Corp. v. U.S. Int’l Trade Com.*, 831 F.2d 1017, 1023 (Fed. Cir. 1987). An examination of the phrase “for

JURY VERDICT (DKT 241)

structures described in the '529 patent for performing those functions, just as you must apply my definitions of any other claim terms.

There are two claim requirements in Claim 1 that use the means-plus-function format. The first requirement that is written in means-plus-function format is "control means capable of receiving control signals from the DC input terminals and from the resonant converter, and operable to effectively stop the oscillations of the converter."

This "control means" requirement recites four functions, as follows:

(1) control means

- (a) capable of receiving a control signal from the DC input terminals and;
- (b) operable to effectively initiate the oscillations, and;

(2) control means

- (a) capable of receiving a control signal from the resonant converter, and;
- (b) operable to effectively stop the oscillations.

The corresponding structure for the "control means" requirement is the control circuit (58) described at column 3, line 59 through column 4, line 21 of the '529 Patent.

The second requirement of Claim 1 that uses the means-plus-function format is the "direct current blocking means" requirement. The claimed function of the "direct current blocking means" is "operable to stop the flow of the control signal from the DC input terminals, whenever the DC control path through the filaments is broken due to lamp removal or a broken filament." The corresponding structure for the "direct current blocking means" requirement is as follows: "DC blocking capacitors (08 and 25) connected to the heatable filaments of the lamp."

All other words of the claims have their plain and ordinary meanings, as those words would be understood by a person of ordinary skill in the field, when read in the context of the patent

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION

LIGHTING BALLAST CONTROL LLC,

Plaintiff,

v.

UNIVERSAL LIGHTING TECHNOLOGIES, INC.,

Defendant.

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CIVIL ACTION NO. 7:09-CV-00029-O

JURY TRIAL DEMANDED**VERDICT FORM****Section No. I – Question Regarding Infringement****QUESTION NO. 1 – INFRINGEMENT OF THE '529 PATENT**

Do you find by a preponderance of the evidence that the ULT products listed below have infringed Claims 1, 2, or 5 of the '529 Patent? Answer "YES" or "NO" as to each product and each claim.

Products	Claim 1	Claim 2	Claim 5
Linear Group 1 (B254PUNV-D (Gen D))	yes	yes	yes
Linear Group 2 (B224PUNV-C (Gen A))	yes	yes	yes
Linear Group 3 (B332PUNVHP-A (Gen A))	yes	yes	yes
Linear Group 4 (B228PUNV115-D, Gen C))	yes	yes	yes
CFL Group 1 (C2642UNVxxx (Gen E))	yes	yes	yes
CFL Group 2 (C213UNVxxx (Gen E))	yes	yes	yes
ES Group (Product TBD)	yes	yes	yes

Case 7:09-cv-00029-O Document 241 Filed 06/17/11 Page 25 of 27 PageID 6041

Section No. II – Question Regarding Invalidity

If you have answered "NO" to all of Question 1 you do not need to consider the question below. If you have answered "YES" to any part of Question 1, then for each claim that you have entered such an answer, you must respond to the question below.

QUESTION NO. 2 – ANTICIPATION

Do you find by clear and convincing evidence that any of the following claims of the '529 Patent are invalid as anticipated? Answer "YES" or "NO" as to each reference and each claim:

Prior Art Reference	Claim 1	Claim 2	Claim 5
JP '997:	No	NO	NO
JP '799:	No	NO	No

Case 7:09-cv-00029-O Document 241 Filed 06/17/11 Page 26 of 27 PageID 6042

Section No. III – Questions Regarding Damages and Willfulness

QUESTION NO. 3 – DAMAGES

Please answer the following question only if you answered "YES" to any part of Question 1 and you answered "NO" for the same claim for Questions 2.

What sum of money, if any, do you find from a preponderance of the evidence is adequate to compensate Plaintiff for Defendant's conduct that you found to infringe? Provide the amount, if any, in dollars and cents.

\$ 3,000,000.00

Case 7:09-cv-00029-O Document 241 Filed 06/17/11 Page 27 of 27 PageID 6043

QUESTION NO. 4 – WILLFUL INFRINGEMENT

Please answer the following question only if you answered "YES" to any part of Question 1 and you answered "NO" for the same claim for Questions 2.

For any of the following claims for which you answered "YES" to any product in Question 1, do you find by clear and convincing evidence that such infringement was willful?

Answer "YES" or "NO": NO

You are finished. The Jury Foreperson should sign on the space provided at the end of this charge and then alert the Court Security Officer that you have reached a verdict.

Certification of Jury Verdict

The foregoing is the unanimous verdict of the jury.

Dated: 6-17-2011


Jury Foreperson

Judy Freeman
Printed Name of Foreperson

MOTION FOR JUDGMENT FILED BY LBC (DKT 244)

is as follows:

Principal	Interest Rate	Interest Total	Principal and Interest	Per Diem Rate
\$3,000,000	5% (state statutory, compounded annually)	\$1,507,049	\$4,507,049	\$607.17
\$3,000,000	3.25% (Prime rate, compounded monthly)	\$933,503	\$3,933,503	\$354.95
\$3,000,000	3.25% (Prime rate, compounded annually)	\$917,406	\$3,917,406	\$345.01

Post-judgment interest should also be awarded at the current statutory rate of 5%.⁴

III. Based on ULT's Litigation Misconduct, the Court Should Deem This Case Exceptional under 35 U.S.C. § 285

A. Introduction

ULT's litigation tactics, from the beginning of this lawsuit, reflect the same corporate mentality that refused to take Mr. Bobel's infringement allegations seriously. As shown at trial, ULT was dismissive of Bobel and conducted little more than a sham investigation. Likewise, ULT has been dismissive of this Court's rules, and it employed a strategy that made the lawsuit time-consuming and expensive for LBC to prosecute. By delaying or refusing to produce key documents, shielding important witnesses from LBC, attempting to tax LBC's resources with superfluous prior art references, last-minute designations of expert witnesses, and an exhibit list that included over 750 trial exhibits, and through various other deceptive litigation strategies, ULT effectively created a zero sum game in which the time and effort expended by LBC in response to ULT's tactics will not be sufficiently compensated by the jury's award. If attorney's fees are not granted in this case, ULT will have succeeded in this regard, and future litigants (and their counsel) will be dissuaded from pursuing similarly situated patent infringers.

⁴ See http://www.occc.state.tx.us/pages/int_rates/Index.html.

As the Federal Circuit has duly noted, “misconduct during litigation” alone can make a case exceptional. *Beckman Instr. Inc. v. LKB Produkter AB*, 892 F.2d 1547, 1551 (Fed. Cir. 1989). After viewing ULT’s litigation behavior as a whole, the Court should find that ULT’s tactics justify an “exceptional case” finding.

B. Relevant Case Law

Under the patent laws, “the court in exceptional cases may award reasonable attorney fees to the prevailing party” in a patent suit. 35 U.S.C. § 285 (1994). “The determination of whether a case is exceptional and, thus, eligible for an award of attorney fees under Section 285 is a two-step process. First, the district court must determine whether a case is exceptional, a factual determination reviewed for clear error. After determining that a case is exceptional, the district court must determine whether attorney fees are appropriate.” *Wedgetail, Ltd. v. Huddleston Deluxe, Inc.*, 576 F.3d 1302 (Fed. Cir. 2009).

The prevailing party must prove the existence of an exceptional case by clear and convincing evidence, which may consist of, but is not limited to: willful infringement; *litigation misconduct*; vexatious, unjustified, and otherwise bad faith litigation; and frivolous suit. *See Hoffmann-La Roche Inc. v. Invamed Inc.*, 213 F.3d 1359, 1365 (Fed. Cir. 2000). “Litigation misconduct and unprofessional behavior are relevant to the award of attorney fees, and may suffice, by themselves, to make a case exceptional.” *Epcon Gas Sys. Inc. v. Bauer Compressors, Inc.*, 279 F.3d 1022, 1034 (Fed. Cir. 2002); *see also Beckman Instr. Inc. v. LKB Produkter AB*, 892 F.2d 1547, 1551 (Fed. Cir. 1989). An award of attorney’s fees can be granted without a finding of willful infringement. *Beckman*, 892 F.2d at 1552. ULT’s litigation conduct in this case provides a textbook example of behavior that makes a case exceptional.

C. ULT Blatantly Violated the Court's Orders and Shielded Important Witnesses and Information from LBC

LBC has previously detailed ULT's decision to thumb its nose at the Court's October 16, 2009 Order, which required ULT to produce, *by December 13, 2009*, all "[s]ource code, specifications, schematics, . . . or other documentation sufficient to show the operation of any aspects or elements of an accused instrumentality" See ECF No. 135 at 29-31. Nearly seven months after that order issued and almost five months after the December deadline had passed, ULT had only produced 259 pages of material and had refused to produce any product samples unless LBC agreed to pay for them. Thousands of critical documents were not produced until 14–16 months *after* the Court's order of October 16, 2009. For example, ULT did not produce any microprocessor code until January 10, 2011 – just four days before the close of fact discovery – even though such code was necessary to make a determination of infringement with respect to all "ES" products. ULT has never provided a credible explanation for its blatant and egregious violation of this order. ULT's misconduct is particularly troubling for at least three reasons: (1) it was in direct violation of the Court's order; (2) ULT tried to exact a strategic advantage from its own misconduct and gamesmanship by trying to rush fact discovery and expert report deadlines, as previously described to the Court (*see* ECF No. 110, ECF No. 135 at 29-21, and Declaration of David Skeels attached as Exh. A to ECF No. 182); and (3) ULT has benefitted from its insistence on strict compliance with the Local Patent Rules (*see, e.g.*, ECF No. 172 at 18-20 and ECF No. 187 at 4-6). The inexcusable delays in document production exacerbated the extreme time pressures associated with the deadline established by the Court's Scheduling Order of December 27, 2010 (ECF No. 114), which included a January 14, 2011 cutoff for factual discovery and a January 24, 2011 expert report deadline.

ULT's pattern of refusing to produce (or delaying production of) relevant information

and its further efforts to deny access to important witnesses cannot reasonably be disputed. On December 10, 2010, LBC was forced to file an Emergency Motion to Modify the Scheduling Order (ECF No. 110, attached hereto as Exhibit 1-B) in order to seek relief from certain deadlines and to compel ULT to produce critical technical information about its products -- information that was specifically required under the Local Patent Rules and in response to LBC's November 13, 2009 Requests for Production (*see* Exh. 1-H, Request Nos. 41 and 42, A-142 and A-143) and that should have been produced twelve months earlier. ULT effectively tried to claim that discovery was completed, thus attempting to relieve itself of its discovery obligations and prevent LBC the necessary time to prepare expert reports.

In fact, approximately one third of ULT's document production was produced after the Court issued its Amended Claim Construction Order on December 2, 2010, and after LBC filed its (opposed) Emergency Motion to Modify Amended Scheduling Order on December 10, 2010 (A-13), which was triggered by ULT's resistance to a reasonable request from LBC to extend the December 17, 2010 expert deadlines. While ULT's failure to timely produce large volumes of documents was egregious enough, it is the content of those late-produced documents, along with other strategic decisions to withhold critical information, that makes ULT's pattern of litigation misconduct indefensible.

1. ULT Produced From Its Files The "Hesterman Notebook" In Late December 2010, and It Produced the Remainder of the So-Called "Hesterman Documents" Less Than 30 Days Before Trial

As the Court is now well aware, Bryce Hesterman, a former ULT engineer, penned or accumulated a number of critical documents relevant to the '529 Patent -- documents that became essential to the cross-examination of nearly all ULT witnesses. These documents detailed ULT's concern about its "intended shutdown scheme" that would violate the '529

Patent, the need to design around the (presumably valid) '529 Patent, and ULT's ultimate inability to design around the '529 Patent. Despite the relevance and importance of these documents, however, ULT did not make the bulk of these documents available to LBC until less than 30 days before trial. In fact, had it not been for a chance encounter between Mr. Hesterman and LBC's validity expert, Dr. Regan Zane, at a conference, LBC would never have seen these documents. It was only after this fortuitous meeting that contact was made with Mr. Hesterman, which ultimately triggered a chain of events that led to these documents finally being produced on the eve of trial. The Court will also recall that ULT's counsel blatantly violated the Court's *in limine* ruling regarding Mr. Hesterman.

2. ULT Deliberately Attempted to Dupe LBC and Its Own Expert Witness With a Non-Representative Product Sample

Under the guise of its infringement rebuttal report, ULT's lawyers selected fourteen "representative" products to explain how other similar products allegedly worked. Then, in the final weeks before trial, ULT's lawyers identified "representative" products for the final seven product groups, including the C2642, Generation E product, which was supposed to "represent" the CFL Group 1 products. What no one knew – not LBC, not the Court, and not ULT's own infringement expert, Robert Burke – was that ULT's attorneys had selected a formerly defective product for CFL Group 1 that did not perform like the other products it supposedly represented. To the contrary, the C2642 Gen E product selected by ULT's counsel as a "representative" product had been the subject of warranty claims and was not at all representative of the other products within CFL Group 1.

In response to this discrepancy, LBC's infringement expert, Dr. Roberts, was forced to spend extra hours attempting to reconcile the inexplicable results of ULT's investigation, as reflected in Mr. Burke's expert report. When Dr. Roberts' testing proved the correct functioning

of products in that group and showed that prior and subsequent versions of the same C2642 product performed in an infringing matter, ULT fought tooth and nail to exclude this testing. This confounding contradiction was finally exposed when LBC tested a properly working C2642 product during Mr. Burke's cross-examination – a test that confirmed how the oscillations of the CFL Group 1 products are stopped when a lamp is removed. As a consequence, Dr. Roberts was finally able to confirm his suspicions – that ULT had surreptitiously and underhandedly selected an anomalous, non-representative product for CFL Group 1 that had apparently been modified to address field defects. ULT had not previously made any mention of the critical details about this defective product to LBC's counsel. ULT's subterfuge cost LBC's attorneys and experts substantial time, money, and effort to finally uncover.

3. ULT Shielded an Unqualified Investigator Who Destroyed Documents Relating to the '529 Patent From Being its 30(b)(6) Representative

When LBC requested a 30(b)(6) deposition of someone with knowledge regarding ULT's investigation into allegations of infringement of the '529 Patent,⁵ ULT chose one of its engineers, Tom Poehlman. What ULT did *not* disclose was that another employee, Travis Berry, was the one who, in the 2005-06 timeframe, actually conducted the investigation into the '529 Patent. At the time of the so-called investigation, Mr. Berry had just recently joined ULT, had no experience in the field of lighting ballast technology, and was wholly unqualified to perform the requisite analysis. In addition, Mr. Berry admitted during his testimony that he destroyed documents created during his "investigation" into the '529 Patent, despite the fact ULT considered Mr. Bobel's 2005 letter a threat of litigation and had just completed a patent infringement matter with Lutron.

ULT's motive for selecting Mr. Poehlman as its corporate representative is clear – to hide

⁵ See Notice of Deposition, Exhibit 1-C, Topics 4 and 5. A-25.

an unqualified engineer who destroyed documents from being deposed by LBC. Mr. Poehlman provided few details about Mr. Berry's investigative activities. Further, Poehlman said he did not know what happened to the documents created in connection with the investigation – thus demonstrating that he had not properly prepared for his deposition as required by Federal Rule of Civil Procedure 30(b)(6). *See* Exh. 1-D, Poehlman Depo. at 61:11-21 (A-46), 63:7-16 (A-48), and 66:24–73:19 (A-51 – A-58). As the Court is now aware, Mr. Berry was in charge of the investigation and created his own set of notes relating to the alleged '529 Patent investigation – notes that were destroyed and have never been produced. Had LBC been given access to a 30(b)(6) witness who had properly prepared on the topic of the investigation, it could have explored further details of the alleged “thorough investigation” instead of being ambushed at trial with these new details. The above instances are simply examples of ULT's purposeful strategy of hiding documents and information from LBC in the hopes of avoiding damaging testimony.

But ULT's strategy did not stop there. ULT's “hide the ball” strategy was sometimes complemented by attempts to bury LBC in last-minute witness lists, lengthy exhibit lists, and novel legal theories it knew had no chance of succeeding. As the parties were working feverishly in the final weeks and days leading up to trial, ULT served a list of trial exhibits that included over 750 documents. *See* Exh. 1-G (A-127). This forced LBC's litigation team to divert valuable resources and personnel for the purpose of reviewing each of those exhibits to determine whether an objection should be raised. By the end of trial, ULT had only offered fifteen or so exhibits from its Defendant's Exhibit List.

Also, at the eleventh hour, ULT raised a brand new legal argument – arguing it did not infringe because its products were not physically “connected to” lamps. ULT did so even though its 30(b)(6) witness on non-infringement had never raised the issue (*see* Exh. 1-D, Poehlman

Depo. at 38:22-49:23, A-33 – A-44), and even though its own experts had never raised the issue. As Dr. Giesselman, ULT's invalidity expert, ultimately testified, those skilled in the art use "connected to" and "for connection to" interchangeably. This argument was similar to ULT's equally untenable argument that the voltage source requirement of Claim 1 rendered the asserted claims indefinite – even though everyone skilled in the art recognized that the "voltage source" claim language connoted the structure of a rectifier. Like the "connected to" argument, this novel "voltage source" argument had no support at any time from any ULT expert. The "voltage source" issue and "connected to" issue were simply litigation-induced creations from ULT's counsel.⁶

Likewise, ULT's evolving invalidity position raises additional concerns. ULT's invalidity arguments initially rested on five prior art references (*see* ECF No. 10 at 4) – none of which saw the light of day at trial. In its Invalidity Contentions, ULT abandoned three of the five references from its Original Answer and Counterclaim and added six additional references (for a total of eight) in their place. Only two of those eight references were ever presented to the jury, even though LBC, including its counsel and experts, had to devote substantial resources to exposing the shortcomings of all of ULT's cited references.

Finally, ULT listed 17 non-retained "experts" with knowledge relating to ULT's products and the '529 Patent. *See, e.g.*, Exh. 1-E (A-62 *et seq.*). Only three of those individuals actually testified at trial. One of those witnesses, Mr. Berry, who had intimate knowledge of the company's investigation into the '529 Patent and did testify at trial, was conveniently buried on this list, and his witness description conveniently fails to identify his assignment as the leader of the so-called "thorough investigation" into Bobel's allegations of infringement. *See* Exh. 1-E at

⁶ During the charge conference, the Court also agreed with LBC that ULT had no basis for its affirmative defenses of laches and waiver. In a similar vein, the Court had previously criticized ULT for misquoting the file history in an attempt to argue that LBC had disclaimed subject matter during prosecution. *See* ECF No. 172 at 11.

2 (A-63). In its Amended Disclosures of January 21, 2011, after the close of discovery, ULT had listed many of these individuals but had simultaneously indicated that such witnesses should only be contacted through ULT's counsel – thereby creating the illusion that ULT had been in contact with them and had secured documents from them. It is now apparent that ULT either (a) did not contact them, or (b) is withholding information or documents that these individuals may have had. *See* Exh. 1-F at 2 (A-83) (“The following individuals [including former employees Bryce Hesterman, Dr. Ruhe Shi, and Ali Fawaz] are current and/or former employees who ULT believes have discoverable information and who should be contacted solely through ULT's attorneys of record in this action.”).

These are just a few examples of a larger problem whereby ULT regularly devised ways to tax LBC's time and resources on issues and evidence it knew it would not be presenting at trial.

D. Conclusion: ULT's Litigation Misconduct Should Be Addressed by An Award of Attorney's Fees

The above-described litigation misconduct is precisely the kind of conduct that makes a case exceptional. ULT's continuous attempts to hide damaging information and witnesses, combined with its attempts to flood LBC with expert lists, exhibit lists, and unsupportable legal theories, reflect a pervasive and intentional litigation strategy designed to tax LBC's resources and make it nearly impossible for LBC to be made whole through an award of damages. The attached Declaration of Jonathan Suder describes attorney's fees of \$1,527,058.25 incurred by LBC to date, which is well below the \$2 million plus in attorney's fees described by ULT's CEO, Mr. Sullivan. LBC therefore requests an award of attorney's fees in an amount that the Court deems appropriate, up to the full amount set forth above. LBC also requests that ULT be ordered to pay an additional award of \$100,000.00 in attorney's fees in the event it chooses to

A5842 – A5873 REMOVED DUE TO CONFIDENTIAL MATERIAL

LBC'S RESPONSE TO ULT'S MOTION FOR JUDGMENT AS MATTER OF LAW
(DKT 247)

A6568 – A6585 REMOVED DUE TO CONFIDENTIAL MATERIAL

LBC'S REPLY ISO ITS MOTION FOR JUDGMENT (DKT 250)

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION

LIGHTING BALLAST CONTROL LLC,

Plaintiff,

v.

UNIVERSAL LIGHTING TECHNOLOGIES, INC.,

Defendant.

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CIVIL ACTION NO. 7:09-CV-00029-O

JURY TRIAL DEMANDED

PLAINTIFF'S REPLY IN SUPPORT OF ITS MOTION FOR JUDGMENT

During trial, ULT demonstrated its contempt for Andrew Bobel and Lighting Ballast Control LLC. To some extent, this could be expected from an adversary in litigation. But ULT's disrespect for the judicial process is inexcusable. ULT has, on more than one occasion, flouted court orders. ULT's latest display of disrespect is found in its Response to LBC's Motion for Judgment (ECF No. 249) ("Response") – a Response in which ULT purports to submit a declaration from its lead counsel that he did not even sign, despite the serious accusations contained therein:

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Executed this 18th day of July, 2011

Steven J. Routh
Steven J. Routh

ECF No. 249, Routh Dec. at 5-6. The declaration is signed "TVP (w/p)" – *i.e.*, Routh's declaration is signed by his associate, T. Vann Pearce, "with permission."

Despite ULT's failure to address its persistent gamesmanship, including its yet-to-be-explained 14-month delay in producing source code, ULT now boasts that it has "**never once**

[been] sanctioned” and has “never [been] found to have violated any Court order.”

Fortunately, the patent laws permit an attorney’s fees award for litigation misconduct – to remind litigants and their attorneys that rules are made to be followed, not flouted.

I. ULT ignores authority supporting LBC’s claim for prejudgment interest.

A. LBC is entitled to prejudgment interest.

At trial, ULT’s laches argument was so lacking in evidentiary support that the Court declined to include a jury instruction on the issue. Nevertheless, ULT now argues that LBC unreasonably delayed in filing suit. The facts belie ULT’s story. Bobel invited ULT to negotiate a license in 2005; he finally received a response in late 2006 stating, without any support, that the patent was invalid; he contacted Acacia in 2007; he negotiated an agreement with Acacia in 2008; and, shortly after its formation, LBC filed suit in early 2009. Bobel, Acacia, and LBC acted diligently at all times. Regardless, ULT’s CEO, Mr. Sullivan, confirmed that an earlier filing of this lawsuit would not have changed anything about the company’s conduct. Thus, ULT cannot and does not claim any prejudice due to the alleged delay. To the contrary, ULT enjoyed four “free” years of infringement selling, without consequence, infringing products – from 1999 through February 2003.¹ An award of prejudgment interest, even at the highest allowable rate, would do nothing to compensate LBC for those years.

B. ULT ignores case law supporting statutory and prime rates.

ULT has ignored the vast weight of authority that supports LBC’s request for prejudgment interest at the statutory or prime rate. *See, e.g.*, LBC’s Motion for Judgment (“Motion”), ECF No. 244, at 2-3 and n.1 (citing cases from multiple districts); *see also Gyromat Corp. v. Champion Spark Plug Co.*, 735 F.2d 549, 551, 557 (Fed. Cir. 1984) (courts may apply

¹ *See, e.g.*, ECF No. 132 at Appx. Vol. 2, A181-A194 (showing sales of Accused Products dating back to 1999).

Case 7:09-cv-00029-O Document 250 Filed 08/01/11 Page 4 of 11 PageID 7701

benefit of using the patent holder's money without fully compensating him for its use," and, "given the historically low rate of return on the T-bill," other rates are more appropriate. *See id.* ("no one would make a long-term, voluntary loan [to an infringer] at the T-Bill rate").

II. "Exceptional case" support: ULT fails to answer key questions about its litigation misconduct and demonstrates its continued disrespect for the judicial process.

A. Unanswered questions remain.

For all its rhetoric and vitriol, ULT has refused to answer many important questions.

1. Why did it take ULT fourteen months to comply with the Court's order – which required early production of documents showing how the Accused Products operate?

Under the Court's order and Local Patent Rule 3-4, ULT's document production was due on **December 13, 2009**. ECF No. 49 at 3. ULT did not fully comply until February 2011 – fourteen months late and more than two weeks after the close of fact discovery. ULT purports to defend itself by admitting that it produced over 20,000 responsive documents in **May 2010** (Response at 4), including, for the first time, component parts lists, product specifications, and wiring diagrams. ULT cannot unilaterally extend – by six months – the Court's deadline. ULT also admits that it made two more untimely productions in late December 2010 (Response at 5) but then defends itself by explaining that such productions were made "**in advance of the [January 14, 2011] fact discovery cut-off**" (Response at 5) – as if the Court's 2009 deadline is irrelevant so long as LBC received the documents before the close of discovery in 2011. ULT's previous insistence on strict compliance with the Local Patent Rules is instructive:

Patent local rules . . . were developed to force parties to crystallize their . . . positions early in the litigation. . . . LBC was *required* to serve infringement contentions in 2009, by the express terms of the operable scheduling order, and those contentions were deemed LBC's *final* contentions unless LBC sought leave to amend them and showed good cause to do so [T]he Patent Rules, and the Court's initial Scheduling Order, expressly *required* LBC to serve adequate infringement contentions and to amend them only under specified conditions. . . .

For LBC to now suggest that the rules requiring adequate infringement contentions were merely mentioned offhand instead of binding upon the parties is simply wrong. And the Court has already ruled otherwise. SJ Ord. at 18-20.

ECF No. 179, at 3, 7-8 (emphasis in original). Further, ULT's *mea culpa* only extends to its untimely productions of May and December 2010 but provides no explanation for its production of microprocessor source code – *all* of which was produced in **January and February 2011**.

ULT also declined to explain why it did not produce product samples. In an era where multiple terabytes of electronically stored information can push document production costs into the tens of thousands of dollars, it is difficult to understand why ULT would resist production of one hundred or so ballast samples that retail or used to retail for \$10-\$15 each and have a hard cost to ULT of much less. Ultimately, LBC relied on product schematics, wiring diagrams, and related technical documents to determine infringement, because those documents were sufficient to explain the operation of the products. But ULT's claim of "cooperation" is difficult to reconcile when it (a) withheld production of product samples, then (b) simultaneously argued, as many of its witnesses did, that the testing of product samples was the best way to evaluate infringement (*see, e.g.*, Reply Appx. A29-A30).²

2. Why were the Hesterman documents produced so late?

ULT confuses two sets of documents: (1) the "Hesterman Notebook," which was always in ULT's possession and was produced with a ULT bates stamp in late December 2010 (more than a year late), and (2) documents retrieved by ULT from Mr. Hesterman on the eve of trial. These distinct sets of documents will be addressed in turn.

The Hesterman Notebook provided smoking gun evidence that ULT (a) was aware of Bobel's '529 Patent, (b) had tried (unsuccessfully, as it turns out) to design around the '529

² For additional briefing and record cites on ULT's delinquent production, *see* ECF No. 135 at 29-31, ECF No. 181 at 1, ECF No. 182, and ECF No. 244 at 6-8, incorporated here by reference.

Patent, (c) wanted to incorporate the technology and benefits of the '529 Patent into its products, and (d) understood the '529 Patent to teach the importance of filament-heating secondary windings – a point LBC emphasized (with limited documentary support from the extrinsic record) during claim construction. The notebook was also responsive to LBC's November 2009 document requests. ULT argues that LBC never filed a motion to compel the notebook, but LBC had no reason or basis to file a motion to compel production of a document it knew nothing about. Seven months have now passed since ULT's production of Hesterman's lab notebook, but ULT has yet to explain the timing of its production.

The second set of documents was obtained on the eve of trial from Hesterman – one of ten ex-ULT employees designated by ULT as an expert. This begs another question that ULT has thus far declined to answer: Why did ULT neglect to secure documents from witnesses that (a) were designated as "expert witnesses ULT may call to testify at trial," (b) were "believe[d] [to] have discoverable information," and (c) according to ULT, "should be contacted solely through ULT's attorneys of record in this action"? *See* ECF No. 245 at A-65 *et seq.* and A-85 *et seq.*

3. Why was Mr. Poehlman in the dark about the destruction of documents from ULT's so-called "investigation"?

ULT now denies a fact that was not disputed at trial – that Mr. Berry, despite being new to the company and not having any experience with electronic lighting ballasts, spearheaded ULT's "investigation" into Mr. Bobel's 2005 letter and then discarded the documents associated with that investigation. Berry admitted at trial: "They weren't retained," even though he and ULT's CEO, Mr. Sullivan, perceived Bobel's letter "as a threat of litigation." *See* Reply Appx. at A7-A17 (especially A13-A15). ULT's 30(b)(6) designee, Mr. Poehlman, previously testified at deposition that he had spoken with Mr. Berry and that such documents (a) were produced, or (b)

did not exist:

Q: Were documents, any documents created in connection with the investigation of the '05-'06 time frame in connection with the 529 Patent, by ULT, created by ULT?

A: I believe we have produced the records that have been maintained about that.

Q: Mr. Poehlman, let me mention some of the topics that you're designated on. . . . [T]opic 5, . . . all internal nonprivileged discussions and communications, whether written or oral, about infringement, alleged infringement, potential infringement of the 529. Do you understand that?

A: Yes, I do.

Q: As far as you know, as you sit here today, you're not aware of any documents?

A: Yes.

Reply Appx. at A86-A97. Apparently, Mr. Berry did not tell Mr. Poehlman that documents had, in fact, been created and later discarded relating to Berry's investigation. Nevertheless, ULT argues that LBC "could have raised [this] issue with ULT or the Court." To the contrary, LBC did not know an issue existed until Berry admitted at trial to the existence of, and his failure to retain, such critical documents.

Berry's failure to inform Poehlman about discarded documents is reminiscent of Poehlman's failure to inform Mr. Burke (ULT's technical expert) that the "representative" CFL Group 1 product had been specially modified to address "field defects" that occurred shortly after Burke left the company and prevented the ballast from stopping oscillations as it was designed to do. *See* Reply Appx. at A55-A57. ULT's pattern of selective silence is troubling.

B. ULT has further demonstrated its disrespect for the judicial process.

Throughout the litigation, ULT has displayed a cavalier attitude toward applicable rules and orders. In addition to ignoring the Court's orders regarding document production, and

allowing the destruction of documents it should have preserved, ULT has ignored the rules of procedure. For example, FRCP 26 requires the disclosing party to “state . . . a summary of the facts and opinions to which the [non-retained expert] witness is expected to testify.” Fed. R. Civ. P. 26(a)(2)(C)(ii). ULT’s disclosures utterly failed to comply with this rule. *See, e.g.*, ECF No. 130 at 3, 9-10 and ECF No. 146 at 2-4. Ultimately, the Court, in its broad discretion, permitted ULT’s non-retained “experts” to testify. However, they were strictly “limited to testifying to that information based upon their personal knowledge gained through their employment with either ULT or a predecessor company.” *See, e.g.*, Reply Appx. at A79-80 (ruling on LBC’s Mot. in Lim.). That limitation was ignored, as described below.

On at least three occasions during the four days of trial testimony, ULT led witnesses into subject matter that was expressly forbidden by the Court. First, ULT elicited expert testimony from Mr. Poehlman about litigation-related product testing. *See* Reply Appx. at A22-A38 (in particular, *see* A33-A34, wherein Court admonished defense counsel). This directly violated the Court’s *in limine* ruling. *See* ECF No. 154 at 2 (LBC’s Mot. in Lim.) and Reply Appx. at A79-A80 (granting LBC’s motion). The Court took issue with this violation (Reply Appx. at A33-A36, A39-A49) and ultimately instructed the jury to disregard portions of Poehlman’s testimony – including all of “his testimony related to Defendant’s Exhibit 145.” Reply Appx. at A54.

Second, ULT tried to elicit testimony from its willful infringement expert, Mr. Nusbaum, regarding the Court’s initial claim construction ruling on “voltage source means.” Reply Appx. at A61-A64. Again, this violated the Court’s *in limine* rulings. *See* ECF No. 154 at 2 (LBC’s Mot. in Lim.) and Reply Appx. at A79 (granting motion). Third, ULT tried to elicit testimony from Mr. Hesterman about his consulting expert work for LBC – immediately after LBC expressed concern on this issue and the Court advised ULT to avoid that topic. Reply Appx. at

A68-A75.

In a final gesture that is emblematic of ULT's *modus operandi*, ULT's lead counsel chose to have an associate sign his "verified" declaration. *See* page 1, *supra*. The failure of a non-lawyer expert witness, such as Dr. Giesselmann, to properly prove up important evidence is, perhaps, understandable. But it is inexcusable for ULT's lead counsel. As to this impropriety, courts may strike declarations for non-compliance with 28 U.S.C. § 1746. *Lentz v. Spanky's Rest. II, Inc.*, 491 F. Supp. 2d 663, 670 (N.D. Tex. 2007); *see also Wojciechowski v. Nat'l Oilwell Varco, L.P.*, 763 F. Supp. 2d 832, 844-45 (S.D. Tex. 2011) (citing 28 U.S.C. § 1746 to explain that "declaration [must be] 'made under penalty of perjury' and [must be] 'verified as true and correct,'" and holding that "[p]arties must strictly comply with the requirement of sworn statements"). LBC respectfully submits that the Court should strike counsel's declaration and disregard the evidence attached thereto. ULT will likely seek to correct this deficiency – a move that would only serve to make LBC's point.

C. LBC provided evidence in support of its request for attorney's fees.

LBC previously provided evidence regarding its attorney's fees and costs.³ To the extent the Court requests further briefing, LBC will timely supplement. *See Additive Control & Measurement Sys. v. Flowdata, Inc.*, 1993 U.S. Dist. LEXIS 20214, *45 (S.D. Tex. May 27, 1993) (upon making "exceptional case" finding, court ordered "that reasonable attorney's fees should be awarded" to party proving patent infringement, in amount to be determined after "further briefing and submissions on this issue").

III. ULT fails to address the harm that would be caused in the absence of an injunction.

ULT pays short shrift to the relevant *eBay* factors. In particular, ULT suggests that LBC

³ *See* Suder Declaration. ECF No. 245 at A-5 to A-10. LBC has incurred additional attorney fees since that time.

A7472 REMOVED DUE TO CONFIDENTIAL MATERIAL

NOTICE OF APPEAL (DKT 258)

**IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF TEXAS
WICHITA FALLS DIVISION**

LIGHTING BALLAST CONTROL LLC,)	
)	
Plaintiff,)	
)	
v.)	C.A. No. 7:09-cv-00029-O
)	
UNIVERSAL LIGHTING TECHNOLOGIES,)	
INC.,)	
)	
Defendant.)	

NOTICE OF APPEAL

Please take notice that Defendant Universal Lighting Technologies, Inc. hereby appeals to the United States Court of Appeals for the Federal Circuit from the Final Judgment entered by this Court on August 26, 2011, in the above-captioned civil action (ECF No. 256), including but not limited to the Court's August 26, 2011 Memorandum Opinion & Order on judgment (ECF No. 255), the Court's May 4, 2011 Summary Judgment Order (ECF No. 172), the Court's May 25, 2011 Order on summary judgment issues (ECF No. 187), and the Court's December 2, 2011 Amended Memorandum Opinion and Order on claim construction (ECF No. 107), and all other rulings and verdicts embodied in the Final Judgment.

Defendant respectfully requests that the District Court Clerk's Office prepare the record of this action for transmission to the Court of Appeals at the earliest practical date so that the parties can move forward expeditiously with an appeal to the Federal Circuit.

Dated: September 12, 2011

Respectfully submitted,

/s/ Deborah L. Sterling

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Brenda T. Cabbage (Texas Bar No. 05201300)

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Attorneys for Defendant

Universal Lighting Technologies, Inc.

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on September 12, 2011, a copy of the foregoing instrument has been served on all counsel listed below via electronic means.

/s/ Deborah L. Sterling

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JTX 2: FILE HISTORY RELATING TO U.S. PATENT NO. 5,436,529



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20531

SERIAL NUMBER	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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08/052,224 04/22/93 ROBEL

DSM1/0909

HILL, STEADMAN & SIMPSON
85TH FLOOR - SEARS TOWER
CHICAGO, IL 60606

EXAMINER
RATLIFF, K

ART UNIT PAPER NUMBER

7

2502
DATE MAILED:

09/09/94

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

☒ This application has been examined ☒ Response to communication filed on 4/22/93 ☐ This action is made final

A shortened statutory period for response to this action is set to expire 3 month(s), 0 days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> Notice of Preliminary Claim by Examiner, PTO 802. | 2. <input checked="" type="checkbox"/> Notice of Draftsman's Patent Drawing Review, PTO 648. |
| 3. <input checked="" type="checkbox"/> Notice of Art Cited by Applicant, PTO-1449. | 4. <input type="checkbox"/> Notice of Informal Patent Application, PTO-182. |
| 5. <input type="checkbox"/> Information on How to Effect Drawing Changes, PTO-1474. | 6. <input type="checkbox"/> _____ |

Part II SUMMARY OF ACTION

1. ☒ Claims 1-18 are pending in the application.
Of the above, claims _____ are withdrawn from consideration.
2. ☐ Claims _____ have been cancelled.
3. ☒ Claims 7-18 are allowed.
4. ☒ Claims 1-5 are rejected.
5. ☒ Claim 6 is objected to.
6. ☐ Claims _____ are subject to restriction or election requirements.
7. ☒ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.
8. ☐ Formal drawings are required in response to this Office action.
9. ☐ The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable; ☐ not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-148).
10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on _____, has (have) been ☐ approved by the examiner; ☐ disapproved by the examiner (see explanation).
11. ☐ The proposed drawing correction, filed _____, has been ☐ approved; ☐ disapproved (see explanation).
12. ☐ Acknowledgment is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☐ been received ☐ not been received ☐ been filed in parent application, serial no. _____; filed on _____.
13. ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 425 O.G. 213.
14. ☐ Other _____

08/052224
PTOL-22 (Rev. 1/89)

EXAMINER'S ACTION

LBC000448

A8131

SW 01/05/2012
AU 1502

Application serial number 08/011,971 has not been abandoned as was indicated at page 1 lines 1-4 of the specification.

Claim 1 is provisionally rejected under 35 U.S.C. § 101 as claiming the same invention as that of claim 1 of copending application Serial No. 08/011,971. This is a *provisional* double patenting rejection since the conflicting claims have not in fact been patented.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5 are rejected under 35 U.S.C. § 102(b) as being anticipated by Zuchtriegel.

Zuchtriegel shows in a operating circuit for fluorescent lamps (see figure 1): voltage source means 2, output terminals (connected to the lamp in the figures), control means 5, and DC blocking means C, (see column 4 lines 27-42 which details this capacitors function with regard to the disconnection and reconnection of the lamp load LP1. It should be noted that structures 3 and 4 are being read as the recited resonant converter. The second common junction of figure 1 is being read as the recited intermediate node. Finally, Zuchtriegel shows capacitor C, connected across a filament of the fluorescent lamp (through the trigger circuit) in a manner readable on the limitations of claim 5.

Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent

LBC000449

form including all of the limitations of the base claim and any intervening claims.

Claims 7-18 are allowable.


The references cited but not relied upon show related art devices.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Reginald A. Rattliff whose telephone number is (703) 308-4904.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956.

RR

September 5, 1994


ROBERT J. PASCAL
SUPERVISORY PATENT EXAMINER
GROUP 2500

LBC000450

IN THE CLAIMS:

Please amend Claim 1 as follows:

1. (Amended) An energy conversion device employing an oscillating resonant converter producing oscillations, having DC input terminals producing a control signal and adapted [for powering] to power at least one gas discharge lamp having heatable filaments, [and] the device comprising:

voltage source means [able to provide] providing a constant or variable magnitude [or a] DC voltage between the DC input terminals;

output terminals [for connection] connected to the filaments of the gas discharge lamp;

P
control means [able to receive a] capable of receiving control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective.

[Please amend Claim 2 as follows:]

2. (Amended) The device [Device] according to Claim [claim] 1 wherein the resonant converter comprises a capacitor and an inductor connected in series via an intermediate node.

[Please amend Claim 3 as follows:]

3. (Amended) The device [Device] according to Claim [claim] 2 wherein the control means is connected to receive the control signal from the intermediate node[;].

[Please amend Claim 4 as follows:]

4. (Amended) The device [Device] according to Claim [claim] 3 wherein the control means [receive] receives the control signal

from the DC input terminals and the signal flows through the output terminals and the intermediate node.

2
cont
[Please amend Claim 5 as follows:]

5. The device [Device] according to Claim [claim] 1 wherein the direct current blocking means [include] ~~includes~~ a capacitor and is [are] connected effectively across at least one heatable filament of at least one gas discharge lamp.

Please ~~cancel~~ Claim 6 and replace with new Claim 19 as follows:

2
cont
(5)¹⁹. An energy conversion device employing an oscillating resonant converter, having DC input terminals and adapted for powering at least one gas discharge lamp having heatable filaments, the device comprising:

voltage source means able to provide a constant or variable magnitude DC voltage between the DC input terminals;

output terminals for connection to the filaments of the gas discharge lamp;

control means able to receive control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and

direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective wherein the direct current blocking means includes a semiconductor diode and is connected effectively across at least one heatable filament of at least one gas discharge lamp.

REMARKS

This Amendment is submitted in response to the Office Action dated September 9, 1994. In the Office Action, the Patent Office provisionally rejected Claim 1 under 35 U.S.C. §101 as claiming the

same invention as that of Claim 1 of copending application U.S. Serial No. 08/011,971. Further, Claims 1-5 were rejected under 35 U.S.C. §102(b) as being anticipated by Zuchtriegel.

Applicant notes with appreciation that the Patent Office indicated that Claims 7-18 are in allowable form. Further, Applicant appreciates the Patent Office indicating that Claim 6 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. To this end, Applicant canceled Claim 6 and incorporated Claim 6 into Claim 1 forming new Claim 9. Applicant, therefore, respectfully submits that Claim 9 is in allowable form.

With respect to the provisional double patenting rejection, Applicant respectfully submits that co-pending application U.S. Serial No. 08/011,971, although not abandoned by the Patent Office, has an Office Action dated September 6, 1994 presently outstanding with a shortened statutory period for response to be filed by December 6, 1994. Therefore, since a response to the Office Action has not been filed, the application is technically abandoned. Furthermore, Applicant does not intend to file a response to the Office Action. Therefore, the provisional double patenting rejection set forth by the Patent Office is overcome and should be withdrawn. Notice to that effect is requested.

Claims 1-5 were rejected under 35 U.S.C. §102(b) as being anticipated by Zuchtriegel. This rejection is respectfully traversed for the reasons that follow and further in view of the claims as amended.

Zuchtriegel discloses a circuit for operating low-pressure discharge lamps at elevated frequency. A resonant circuit disables the disconnect circuit upon exchange of a defective low-pressure discharge lamp. A disconnect circuit has a diode, a resistor and a thyristor together with a trigger circuit. The reconnect circuit

has a capacitor and a resistor. Upon removal of the defective low-pressure discharge lamp, the capacitor is charged over the resistor. Upon insertion of a new low-pressure discharge lamp, the capacitor is discharged and recharged in opposite direction, and the holding current is removed from the thyristor. This causes the thyristor to block, and enables the push-pull frequency generator to start oscillating again.

The present invention, however, as positively defined in independent Claim 1, requires an energy conversion device employing an oscillating resonant converter producing oscillations and further having DC input terminals producing a control signal and adapted to power at least one gas discharge lamp. The device has a voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals. Output terminals are connected to the filaments of the gas discharge lamp. A control means is capable of receiving control signals from the DC input terminal and from the resonant converter. The control means is further operable to effectively initiate the oscillation and to effectively stop the oscillations of the converter. A direct current blocking means is coupled to the output terminal and operable to stop flow of the control signal from the DC input terminals whenever at least one gas discharge lamp is removed from the output terminals or is defective.

~~Zuchtriegel~~, unlike the present invention, as positively defined by Claim 1, does not disclose a specific control means that is operable to effectively initiate and stop the oscillations of the resonant converter. Further, direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals whenever at least one gas discharge line is removed from the output terminals or is defective is not taught. This particular arrangement of control

means and direct current blocking means is neither taught nor suggested by Zuchtriegel.

Under 35 U.S.C. §102, anticipation requires that a single reference discloses each and every element of the claimed invention. Akzo N.V. v. U.S. International Trade Commission, 808 F.2d 1471, 1479, 1 USPQ 2d 1241, 1245 (Fed. Cir. 1986). Moreover, anticipation is not shown even if the differences between the claims and the prior art reference are "insubstantial", and one skilled in the art would supply the missing elements. Structure Rubber Products Company v. Park Rubber Company, 749 F.2d 707, 716, 223 USPQ 1264, 1270 (Fed. Cir. 1984).

Since Zuchtriegel fails to disclose the elements positively defined in amended Claim 1, the rejection of Claim 1 under 35 U.S.C. §102(b) is improper and should be withdrawn. Notice to that effect is requested.

Claims 2-5 depend from Claim 1. These claims are further believed allowable over Zuchtriegel and the other references of record, taken singly or in combination, since each claim further defines positive structural elements of the energy conversion device of Claim 1.

In view of the foregoing remarks and amendments, Applicant respectfully submits that all of the claims in the application are in allowable form and that the application is now in condition for allowance. If, however, any outstanding issues remain, Applicant respectfully urges the Patent Office to telephone Applicant's attorney so that the same may be resolved and the application expedited to issue. Applicant requests the Patent Office to



UNITED STATES DEPARTMENT OF COMMERCE
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Washington, D.C. 20531

SERIAL NUMBER	FILED DATE	FIRST NAMED APPLICANT	ATTORNEY IN FIRMET No.
08/052,224	04/22/93	DMCEL	
		ART UNIT	PAPER NUMBER
		2502	9
		DATE MAILED: 12/27/94	

HILL, STEPHEN A. SIMPSON
15TH FLOOR - SHERIDAN TOWER
CHICAGO, IL 60601

0541/1227

EXAMINER
RATLIFF R

NOTICE OF ALLOWABILITY

- PART I
1. ☒ This communication is responsive to paper # 8 filed 12/12/94
2. ☒ As the claims being allowable, PROSECUTION ON THE MERITS IS NOW REMAINING CLOSED in this application. It not included herewith (or previously mailed), a Notice Of Allowance And Issue Fee Due or other appropriate communication will be sent in due course.
3. ☒ The allowed claims are 1-5 and 7-14
4. ☒ The drawings filed on 12/12/94 are acceptable.
5. ☒ Acknowledgment is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☒ been received, ☐ not been received, ☐ is being held in patent application Serial No. 0541/1227 filed on 12/12/94.
6. ☒ Note the attached Examiner's Amendment.
7. ☒ Note the attached Examiner Interview Summary Record, PTO-413.
8. ☒ Note the attached Examiner's Statement of Reasons for Allowance.
9. ☒ Note the attached NOTICE OF REFERENCES CITED, PTO-807.
10. ☒ Note the attached INFORMATION DISCLOSURE CITATION, PTO 1449.
- PART II
- A SHORTENED STATUTORY PERIOD FOR RESPONSE to comply with the requirements noted below is set to EXPIRE THREE MONTHS FROM THE "DATE MAILED" indicated on this form. Failure to timely comply will result in the ABANDONMENT of this application. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).
1. ☒ Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL APPLICATION, PTO-152, which discloses that the oath or declaration is not required. A SUBSTITUTE OATH OR DECLARATION IS REQUIRED.
2. ☒ APPLICANT MUST MAKE THE DRAWING CHANGES INDICATED BELOW IN THE MANNER SET FORTH ON THE REVERSE SIDE OF THIS PAPER.
- a. ☒ Drawing corrections are indicated on the NOTICE RE PATENT DRAWINGS, PTO-848, attached hereto or to Paper No. 0541/1227. CORRECTION IS REQUIRED.
- b. ☐ The proposed drawing correction filed on 12/12/94 has been approved by the examiner. CORRECTION IS REQUIRED.
- c. ☐ Approved drawing corrections are described by the examiner in the attached EXAMINER'S AMENDMENT. CORRECTION IS REQUIRED.
- d. ☒ Final drawings are now REQUIRED.

Any responses to this letter should include in the upper right hand corner, the following information from the NOTICE OF ALLOWANCE AND ISSUE FEE DUE: ISSUE BATCH NUMBER, DATE OF THE NOTICE OF ALLOWANCE, AND SERIAL NUMBER.

Attachments:

Examiner's Amendment
Examiner Interview Summary Record, PTO-413
Statement of Reasons for Allowance
Notice of References Cited, PTO-807
Information Disclosure Citation, PTO-1449

Notice of Informal Application, PTO-152
Notice to Patent Drawings, PTO-848
Notice of Substantive Examination
Other

Benny Lee
BENNY F. LEE
EXAMINER
ART UNIT 252

08/052,224
100-27 REV (1-93)

USPTO/PAID 08-27/95

LBC000468

A8151

**JTX 4: EXCLUSIVE LICENSE AGREEMENT BETWEEN ANDRZEJ BOBEL AND
ACACIA PATENT ACQUISITION LLC, DATED AUGUST 8, 2008**

A8215 – A8226 REMOVED DUE TO CONFIDENTIAL MATERIAL

JTX 5: BOBEL - ACACIA AGREEMENT SIGNATURE PAGE

A8228 REMOVED DUE TO CONFIDENTIAL MATERIAL

JTX 6: ACACIA PRESS RELEASE, DATED SEPTEMBER 22, 2008



Contacts: Rob Stewart
Investor Relations
Tel (949) 480-8300
Fax (949) 480-8301

FOR RELEASE
September 22, 2008

**ACACIA SUBSIDIARY ACQUIRES RIGHTS TO PATENTS
FOR LIGHTING BALLAST TECHNOLOGY**

Newport Beach, CA. – (BUSINESS WIRE) September 22, 2008 – Acacia Research Corporation (Nasdaq:ACTG) announced today that its subsidiary, Acacia Patent Acquisition LLC, has acquired rights to patents relating to lighting ballast technology.

“Acacia continues to grow its base of future revenues by adding new patent portfolios,” commented Paul Ryan, Acacia Chairman and CEO. “As our licensing success grows, more companies are selecting us as their partner for the licensing of their patented technologies,” concluded Mr. Ryan.

This patented technology generally relates to controlling power to fluorescent lamps. The technology may be used in lighting ballasts for industrial applications.

ABOUT ACACIA RESEARCH CORPORATION

Acacia Research’s subsidiaries develop, acquire, and license patented technologies. Acacia Research’s subsidiaries control 98 patent portfolios, which include U.S. patents and certain foreign counterparts, covering technologies used in a wide variety of industries.

Information about Acacia Research is available at www.acaciatechnologies.com and www.acaciaresearch.com.

Safe Harbor Statement under the Private Securities Litigation Reform Act of 1995

This news release contains forward-looking statements within the meaning of the “safe harbor” provisions of the Private Securities Litigation Reform Act of 1995. These statements are based upon our current expectations and speak only as of the date hereof. Our actual results may differ materially and adversely from those expressed in any forward-looking statements as a result of various factors and uncertainties, including the recent economic slowdown, affecting technology companies, our ability to successfully develop products, rapid technological change in our markets, changes in demand for our future products, legislative, regulatory and competitive developments and general economic conditions. Our Annual Report on Form 10-K, recent and forthcoming Quarterly Reports on Form 10-Q, recent Current Reports on Forms 8-K and 8-K A, and other SEC filings discuss some of the important risk factors that may affect our business, results of operations and financial condition. We undertake no obligation to revise or update publicly any forward-looking statements for any reason.

**JOINT EXHIBIT
NO. 6**

LBC001101

JTX 7: CERTIFICATE OF INCORPORATION

Corporations Section
P.O.Box 13697
Austin, Texas 78711-3697



Hope Andrade
Secretary of State

Office of the Secretary of State

September 29, 2008

Registered Agent Solutions, inc.
515 Congress Ave., Suite 2300
Austin, TX 78701 USA

RE: Lighting Ballast Control LLC
File Number: 801034161

It has been our pleasure to file the certificate of formation and issue the enclosed certificate of filing evidencing the existence of the newly created domestic limited liability company (llc).

Unless exempted, the entity formed is subject to state tax laws, including franchise tax laws. Shortly, the Comptroller of Public Accounts will be contacting the entity at its registered office for information that will assist the Comptroller in setting up the franchise tax account for the entity. The initial franchise tax report will be due a year and 89 days after the effective date of formation. Thereafter, an annual franchise tax report is due each May 15. Information about franchise tax, and contact information for the Comptroller's office, is available on their web site at <http://window.state.tx.us/taxinfo/franchise/index.html>.

The entity formed does not file annual reports with the Secretary of State. Documents will be filed with the Secretary of State if the entity needs to amend one of the provisions in its certificate of formation. It is important for the entity to continuously maintain a registered agent and office in Texas. Failure to maintain an agent or office or file a change to the information in Texas may result in the involuntary termination of the entity.

If we can be of further service at any time, please let us know.

Sincerely,

Corporations Section
Business & Public Filings Division
(512) 463-5555

Enclosure

JOINT EXHIBIT
NO. 7


Phone: (512) 463-5555
Prepared by: Lynda Boots

Come visit us on the internet at <http://www.sos.state.tx.us/>
Fax: (512) 463-5709
TID: 10285

Dial: 7-1-1 for Relay Services
Document: 231117440002

LBC001240

A8232

Form 205 (Revised 01/06) Return in duplicate to: Secretary of State P.O. Box 13697 Austin, TX 78711-3697 512 463-5555 FAX: 512 463-5709 Filing Fee: \$380	 Certificate of Formation Limited Liability Company	This space reserved for office use. FILED In the Office of the Secretary of State of Texas SEP 26 2008 Corporations Section
--	--	---

The filing entity being formed is a limited liability company. The name of the entity is:

Lighting Bulb Control LLC

The name must contain the words "limited liability company," "limited company," or an abbreviation of one of these phrases.

☒ A. The initial registered agent is an organization (must be duly named above) by the name of:

Registered Agent Solutions, Inc.

OR

☐ B. The initial registered agent is an individual resident of the state whose name is set forth below:

First Name	M.I.	Last Name	State
C. The business address of the registered agent and the registered office address is:			
515 Congress Avenue, Suite 2300	Austin	TX	78701
Street Address	City	State	Zip Code

☐ A. The limited liability company will have managers. The name and address of each initial manager are set forth below.

☒ B. The limited liability company will not have managers. The company will be governed by its members, and the name and address of each initial member are set forth below.

IF INDIVIDUAL				
First Name	M.I.	Last Name	State	
OR				
IF ORGANIZATION				
Acacia Petal Acquisition LLC				
Organization Name				
500 Newport Center Drive, 7th Floor	Newport Beach	CA	USA	92660
Street or Mailing Address	City	State	Country	Zip Code

Form 205

LBC001241

A8233

IF INDIVIDUAL					
First Name		MI	Last Name		Suffix
OR					
IF ORGANIZATION					
Organization Name					
Street or Mailing Address					
City		State	Country	Zip Code	

IF INDIVIDUAL					
First Name		MI	Last Name		Suffix
OR					
IF ORGANIZATION					
Organization Name					
Street or Mailing Address					
City		State	Country	Zip Code	

The purpose for which the company is formed is for the transaction of any and all lawful purposes for which a limited liability company may be organized under the Texas Business Organizations Code.

Test Area (The attached solicitation, if any, is incorporated herein by reference.)

--

[REDACTED]

The name and address of the organizer:

Cheryl Wilkford

Age:

510 Newport Center Drive, 7th Floor

Newport Beach

CA 92660

Street or Mailing Address

City

State Zip Code

[REDACTED]

A. ☒ This document becomes effective when the document is filed by the secretary of state.

B. ☐ This document becomes effective at a later date, which is not more than ninety (90) days from the date of signing. The delayed effective date is: _____

C. ☐ This document takes effect upon the occurrence of the future event or fact, other than the passage of time. The 90th day after the date of signing is: _____

The following event or fact will cause the document to take effect in the manner described below:

[REDACTED]

The undersigned signs this document subject to the penalties imposed by law for the subscription of a materially false or fraudulent instrument.

Date: September 24, 2008


Signature of Organizer

**JTX 8: OCTOBER 22, 2008 ASSIGNMENT AND ASSUMPTION AGREEMENT
BETWEEN ACACIA PATENT ACQUISITION LLC AND LBC**

A8237 – A8238 REMOVED DUE TO CONFIDENTIAL MATERIAL

**JTX 9: ROBERTSON PRODUCT INFORMATION – LAMP END OF LIFE CIRCUIT
PROTECTION**



Robertson

Robertson Transformer's electronic ballasts for compact fluorescent lamps all include, as a standard feature, an end-of-life protection circuit that protects the ballast and fixture from physical failure of the lamp by detecting when a lamp is approaching end of life and safely shutting down.

The lighting industry has raised concern over the abnormal physical failure of fluorescent lamps at end-of-life. Physical failure can include glass breakage and melting of the lamp base, and sometimes melting of the lamp socket. This phenomenon can occur due to a number of conditions:

Loss of Emissive Coating on Electrode

One of the more common lamp end-of-life modes of failure is when the emissive coating on the electrode of the lamp is lost, or greatly reduced. This is common as a fluorescent lamp reaches its normal end-of-life.

During normal operation lamp current flows equally in both directions in a balanced or "symmetrical" fashion. Due to loss of emissive coating (or a number of other conditions) current begins to flow predominantly in one direction and becomes unbalanced or "asymmetrical." When operated by certain types of electronic ballasts this situation can lead to super heating of the lamp electrode, which in turn overheats the lamp glass and base.

Internally, the lamp gas pressure is lower than the outside atmosphere, and if the glass gets hot enough to soften, outside atmospheric pressure collapses the glass tube of the lamp.

Loss of Glass Envelope Seal

The seal that maintains the gas in the lamp is broken, or the glass itself is fractured, allowing atmosphere to rush into the lamp. It will no longer support an arc (lamp current flow).

Electrode Breakage

The lamp electrode breaks and will no longer support an arc.

PRODUCT INFORMATION

Lamp End-of-Life Circuit Protection

Robertson's end-of-life circuit protection

Robertson's patented shutdown circuit protects at all times, during starting, and during operation for the entire life of the lamp. By constantly monitoring the voltage across the lamp it will safely turn the ballast off if any of the following conditions occur;

- **Asymmetrical lamp current flow** for any reason (including loss of emissive material from electrode) that could lead to overheating.
- **Loss of lamp seal**, when lamp cannot sustain a current arc.
- **Electrode breakage**
- **Removal of lamp from socket** (protection for maintenance personnel during relamping)

After the shutdown circuit has been activated the ballast is off, but in a "sleep mode," ready to automatically restart when the lamp is replaced.

It is *not necessary to cycle* (turn off, then on) the power to the ballast.

The Robertson shutdown circuit has been extensively tested for each model, and will not shutdown prematurely, even during the demands of starting lamps in below-freezing conditions.

A FEW WORDS FROM OUR ENGINEERING DEPARTMENT...

All Robertson electronic ballasts for compact fluorescent lamps developed in the last two years have included end-of-life circuit shutdown

protection as a standard feature, not as an option that you have to pay more for.

This includes the RED, REJ and REC product series for quad and triple tube

lamps, as well as the REH series for long twin-tube T5 lamps. And, this feature will be included in all new Robertson products for T2, T4 and T5 lamps.

ICP-R10.97

The ROBERTSON TRANSFOI
13811 THORNTON ROAD
BLUE ISLAND, IL 60406

CALL TOLL FREE (800) 323-5633 (EXCEPT

JOINT EXHIBIT
NO. 9

P A N Y
708) 388-2315
708) 388-2420



LBC001248

JTX 10: ROBERTSON DOCUMENTS: ROBERTSON MARKING LITERATURE



ROBERTSON END OF LAMP LIFE SHUTDOWN CIRCUIT

Products Covered

Robertson Transformer has incorporated an end of lamp life shutdown circuit in all models of the RED and REJ families, and have been shipping these ballasts with this feature for over two years.

All future new products for compact fluorescent, and linear fluorescent with tube diameters of T6 or smaller will incorporate end of lamp life shutdown as a feature. This includes the REC and REH families of products that have been released recently.

Lamp End of Life

A lamp will cease to operate due to a number of conditions. The three most common are; 1. Loss of gas 2. Loss of emissive material on an electrode. 3. Electrode breakage. **The Robertson end of lamp life shutdown circuit will react to all of these conditions, both during start up and during operation.**

Generally, the loss of emissive material on one electrode is the cause for melting sockets and super-heated electrodes leading to glass tube breakage, due to the lamp arc current flowing through the tube asymmetrically (greater current in one direction) instead of closely balanced as is normal.

Circuit Operation

The shutdown circuit continuously monitors lamp voltage and current (both during starting and operation). If an electrode breaks, or the circuit senses any abnormal lamp (load) conditions related to end of life (increased lamp voltage or asymmetrical arc current), the ballast goes into a "sleep mode."

Replacement of the Lamp

After the ballast has shutdown, only one lamp need be replaced for the lamp/ballast system to start up again. It is not necessary to cycle the ballast on and off in order to resume operation.

And because the ballast can sense a broken electrode, it can also sense a missing lamp. Thus there is never high voltage present at the socket while the ballast is in the shutdown or sleep mode. This provides as an additional safety feature for maintenance personnel.

CORPORATE HEADQUARTERS

13611 THORNTON ROAD, BLUE ISLAND, ILLINOIS 60406 • 708/388-2315, 312/785-7177 - 800/323-5633 - Fax 708/388-2420

JOINT EXHIBIT
NO. 10

LBC001853

TECHNOLOGY REPORT

BALLASTS

Study: Ballast Standards May Not Ensure Lamp Life

BY YUNFEN JI

Yunfen Ji is a research specialist at the Lighting Research Center's Technology Group, Troy, N.Y. He has published more than 15 technical papers on energy-efficient lighting products, luminaires, ballasts, HID dimming systems, and fluorescent lamp-ballast compatibility. He also received the Taylor Technical Talent Award from the IESNA in 1994.

TROY, N.Y.—According to the U.S. Census Bureau, electronic ballasts for fluorescent lamps have come to dominate the market. From 1986 to 1996, the value of shipments of electronic ballasts increased from about \$12 million to about \$500 million. During the same time period, the market for these products has grown from 2.9 percent to 49.7 percent by value of the overall fluorescent lamp ballast industry. The rapid increase in the use of electronic ballasts and the corresponding increase in the number of new products and new ballast manufacturers raise important questions about the compatibility of fluorescent lamps and electronic ballasts.

In June 1995, the Lighting Research Center (LRC) at Rensselaer Polytechnic Institute began a



Recent testing done by the Lighting Research Center indicates that present ANSI life cycle standards may not assure lamp-ballast compatibility.

three-year fluorescent lamp-ballast research project to address compatibility and testing issues. The Empire State Electric Energy Research Corp., New York; the New York State Energy Research & Development Authority, Albany, N.Y.; and the National Lighting Product Information

Program, Troy, N.Y., cofunded the project. The goals of this ongoing project are to determine how ballasts affect lamp life, whether an accelerated life-testing method can be used to reduce the time needed for life testing, and to see if there is any method to predict lamp life.

Lighting specifiers and end users know that a poor match of lamp and ballast can cause short lamp life, poor lamp starting, and increased

end-darkening. A well-matched system can provide two energy advantages over magnetically ballasted systems: high-frequency operation increases fluorescent lamp efficacy by about 10 percent to 15 percent and electronic ballasts experience 10 percent less ballast loss than magnetic ballasts. Electronic ballasts operate fluorescent lamps at 20 kHz to 60 kHz. Using electronic ballasts to operate two 40-watt T12 lamps can save 16 watts compared with using energy-efficient magnetic ballasts to operate the same system.

Lamp life testing is essential to determining the compatibility of a fluorescent lamp-ballast system. However, the standard lamp life testing cycle—three hours on and 20 minutes off—presents a barrier to obtaining quick and accurate results. Lamp life testing using the standard cycle may take two to three years to complete. This long period provides plenty of opportunity for manufacturers to update their line of lamps and ballasts, so such lengthy experiments may result in test data for products that are no longer on the market.

Electronic Ballast Types

An understanding of the operation of the major types of electronic ballasts is essential to understanding the research and the possible changes the outcomes could mean for fluorescent lamp-ballast systems.

Electronic ballasts for four-foot fluorescent lamps generally

are either rapid-start or instant-start ballasts. Rapid-start ballasts have a separate set of windings that provides a low voltage—about 3.5 volts—to the electrodes, heating them between 700 degrees C and 1,000 degrees C in one to two seconds. Then a starting voltage of 200 volts to 300 volts is applied, striking an arc. Most rapid-start ballasts continue to supply the voltage to heat the electrodes even after the lamp has started, which results in a power loss of about two watts to four watts per lamp. Rapid-start ballasts start lamps with a brief delay, but without flashing.

Instead of heating the electrodes, instant-start ballasts provide a high initial voltage—over 400 volts—to strike the arc. This high voltage is required to initiate discharge between the unheated electrodes of the lamp. Instant-start ballast systems have lower power losses than rapid-start ballast systems because there is no heating voltage. However, the cold electrodes of an instant-start system may experience greater damage than the warmed electrodes of a rapid-start system, resulting in reduced lamp life. Instant-start ballasts light lamps without delay or flashing.

For fluorescent lamps, life is determined by the loss of the

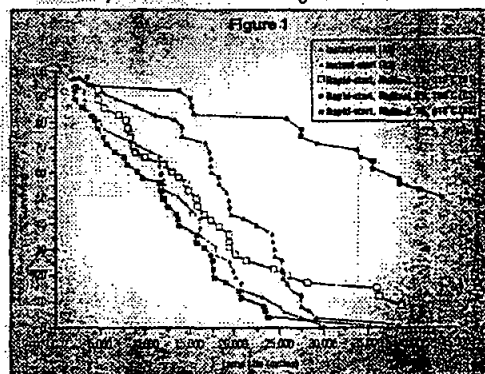
time for rapid-start ballasts, it dictates that the lamp electrode did not receive enough heating. Thus, lamp life will be reduced by the electrode sputtering during starting.

Although instant-start ballasts are more energy efficient than rapid-start ballasts, the industry has traditionally believed that instant-start ballasts damage electrodes much more than rapid-start ballasts because they do not preheat.

Lamp manufacturers have published data that show instant-start ballast may reduce lamp life by 25 percent compared with rapid-start operation at three hours per start. For longer burning cycles—12 hours or more per start—the difference between instant-start and rapid-start lamp life is believed to be much less. At cycles shorter than three hours on, manufacturers suspect that the lamp life reduction caused by instant start operation could be greater than 25 percent. Thus, manufacturers commonly recommend avoiding the use of instant-start ballasts in applications where lamps may be frequently switched, such as with occupancy sensors.

Testing

Life Testing: The LRC focused testing on electronic ballasts for



This graph represents results of rapid-cycle testing for F32T8 lamps with electronic ballasts.

electron emissive coating on the electrodes. High electrode temperatures reduce lamp life by evaporating the emissive coating. Low electrode temperatures reduce lamp life by increasing electrode sputtering. During fluorescent lamp starting, a minimum of 700 degrees C is needed to assure minimum sputtering. If the electrode temperature is below this level after the preheat

two F32T8 fluorescent lamps and evaluated five different types of electronic ballasts from three manufacturers, including three rapid-start and two instant-start electronic ballasts.

The LRC compared a rapid testing cycle—five minutes on and five minutes off—with the standard life testing cycle to evaluate how the two different ballast starting methods affect

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LBC001928

JTX 18: LETTER FROM ROBERTSON TO BOBEL, DATED MARCH 5, 2009

A8289 REMOVED DUE TO CONFIDENTIAL MATERIAL

JTX 19: TERMINATION OF ROBERTSON LICENSE

Andrzej Bobel
640 Leland Court
Lake Forest, Illinois, 60045, USA
Tel. 847-615-8775
Fax 847-615-8776
Email: abobel@yahoo.com

Via Certified Mail Return Receipt Requested

November 21, 2008

Ms. Marjorie Pelino, President of the Board of Directors
Mr. Greg Traphagen, President and CEO
Robertson Transformer Company
a/k/a Robertson Worldwide, Inc.
13611 Thornton Road
Blue Island, IL 60406

Re: License Agreement between
Andrzej Bobel and Robertson
Transformer Co. dated May 12th, 1994.

Dear Mr. Traphagen and Ms. Pelino,

By letter of October 3, 2008, I notified Robertson that it was in default of our May 12, 1994 Agreement, and I provided notice of my intent to terminate the Agreement. Thirty days passed without any effort by Robertson to remedy the default. Therefore, pursuant to Section 5.04 of the Agreement, the Agreement has been terminated. I reserve the right to seek any and all remedies to which I may be entitled, under the Agreement or otherwise, including the right to seek recovery of unpaid and/or past due royalties and interest.

Sincerely,

Andrzej Bobel

Cc: Mr. William H. Frankel
Brinks, Hofer, Gilson & Lione
NBC Tower - Suite 3600,
455 N. Cityfront Plaza Drive,
Chicago, IL 60611
(via CMRRR)

JOINT EXHIBIT
NO. 19

LBC001969

A8291

JTX 46: BOBEL LETTER TO GE (LBC000013 – LBC000015)

Preactical Innovations, Inc.

Andrew Bobel

640 Leland Court
Lake Forest, Illinois, 60045, USA
Tel. 847-615-8775
Fax 847-615-8776
Email: abobel@yahoo.com

December 30, 2005

By Federal Express

Mr. Jeff Immelt, Chairman and CEO
General Electric Company
3135 Easton Turnpike
Fairfield, CT 06828-0001
United States

Hand Delivered to

GE Lighting
Booth #337
Lightfair International 2006
Las Vegas Convention Center
Las Vegas, Nevada

**License Proposal
And Notification**

Dear Mr.: Immelt,

This letter is mailed to notify you that Practical Innovations, Inc., a Delaware Corporation, of Lake Forest, Illinois and its President, Andrzej (Andrew) Bobel have developed, originated, invented and improved control and protection circuits for electronic ballasts, self-protected series resonant electronic energy converters, inverters, fluorescent lamps and light sources, and other circuitry, light equipment and devices therefore, as well as methods for manufacturing and using the preceding, which are protected under U.S. Patent No. 5,436,529, US Patent No. 5,982,106 (copies enclosed) and other U.S. patents.

It has come to the attention of Practical Innovations, Inc. and Andrew Bobel that General Electric Company., also known as GE, is manufacturing, selling, marketing, distributing and/or supplying ballasts for fluorescent lighting and ballasts, which include self-protected series resonant energy converters, control and protection circuits for electronic ballasts, and other inventions under the trademarks and brand name of UltraStart™ and UltraMax™, and other names which are covered by Bobel patents.

JOINT EXHIBIT
NO. 46

LBC000013

A8480

The infringing models include but not limited to the following:

GE254MVFEN1
GE254MVFEN1-B
GE454MVFEN1
GE454MVFEN1-B

B224PUNV-COGIC
B224PUNV-COGIC
B224PUNV-COGIC
B254PUNV-DGIC
B254PUNV-DGIC

C218UNVSE-P
C218UNVSE-P
C218UNVSE-P
C218UNVSE-P
C218UNVSE-P

C218UNVSE-P
C240PUNV-P-S-IP
C240S120R-IP
C240S277R-IP
C240UNVSE-IP

C242UNVSE-P
C242UNVSE-P
C242UNVSE-P
C242UNVSE-P
C240S120R-IP

C240S277R-IP

Infringement	Product Code	Description	GE Ultralux Ballasts			F2T8 Input Watts			F2T8T8 Input Watts			F2T8T8 Input Watts			Per Case
			Input Voltage	Input Watts	In Power	Input Watts	Open	In Power	Input Watts	Open	In Power	Input Watts	Open	In Power	
GE	1	GE254MVFEN1	Ballast	120	21	25	25	25	25	25	25	25	25	25	9
	2	GE254MVFEN1-B	Ballast	120	21	25	25	25	25	25	25	25	25	25	9
	3	GE454MVFEN1	Ballast	120	46	46	46	46	46	46	46	46	46	46	18
	4	GE454MVFEN1-B	Ballast	120	46	46	46	46	46	46	46	46	46	46	18
	5	GE254MVFEN1	Ballast	120	21	25	25	25	25	25	25	25	25	25	9
	6	GE254MVFEN1-B	Ballast	120	21	25	25	25	25	25	25	25	25	25	9
	7	GE454MVFEN1	Ballast	120	46	46	46	46	46	46	46	46	46	46	18
	8	GE454MVFEN1-B	Ballast	120	46	46	46	46	46	46	46	46	46	46	18
	9	GE254MVFEN1	Ballast	120	21	25	25	25	25	25	25	25	25	25	9
	10	GE254MVFEN1-B	Ballast	120	21	25	25	25	25	25	25	25	25	25	9
GE	1	GE254MVFEN1	Ballast	120	42	42	42	42	42	42	42	42	42	42	9
	2	GE254MVFEN1-B	Ballast	120	42	42	42	42	42	42	42	42	42	42	9
	3	GE454MVFEN1	Ballast	120	84	84	84	84	84	84	84	84	84	84	18
	4	GE454MVFEN1-B	Ballast	120	84	84	84	84	84	84	84	84	84	84	18
	5	GE254MVFEN1	Ballast	120	42	42	42	42	42	42	42	42	42	42	9
	6	GE254MVFEN1-B	Ballast	120	42	42	42	42	42	42	42	42	42	42	9
	7	GE454MVFEN1	Ballast	120	84	84	84	84	84	84	84	84	84	84	18
	8	GE454MVFEN1-B	Ballast	120	84	84	84	84	84	84	84	84	84	84	18
	9	GE254MVFEN1	Ballast	120	42	42	42	42	42	42	42	42	42	42	9
	10	GE254MVFEN1-B	Ballast	120	42	42	42	42	42	42	42	42	42	42	9
GE	1	GE254MVFEN1	Ballast	120	42	42	42	42	42	42	42	42	42	42	9
	2	GE254MVFEN1-B	Ballast	120	42	42	42	42	42	42	42	42	42	42	9
	3	GE454MVFEN1	Ballast	120	84	84	84	84	84	84	84	84	84	84	18
	4	GE454MVFEN1-B	Ballast	120	84	84	84	84	84	84	84	84	84	84	18
	5	GE254MVFEN1	Ballast	120	42	42	42	42	42	42	42	42	42	42	9
	6	GE254MVFEN1-B	Ballast	120	42	42	42	42	42	42	42	42	42	42	9
	7	GE454MVFEN1	Ballast	120	84	84	84	84	84	84	84	84	84	84	18
	8	GE454MVFEN1-B	Ballast	120	84	84	84	84	84	84	84	84	84	84	18
	9	GE254MVFEN1	Ballast	120	42	42	42	42	42	42	42	42	42	42	9
	10	GE254MVFEN1-B	Ballast	120	42	42	42	42	42	42	42	42	42	42	9

This has occurred without the authorization of Practical Innovations, Inc. and Andrew Bobel.

Practical Innovations, Inc. and Andrew Bobel are willing to offer a license to GE under reasonable terms and conditions.

Without a license from Practical Innovations, Inc. and Andrew Bobel, courts and juries in the United States would likely consider GE continued manufacture, sale, marketing, distribution, and/or supply of such ballasts which include self-protected series resonant electronic energy converters, control and protection circuits for electronic ballasts, or other inventions to amount to intentional and willful infringement of Bobel U.S. Patent No. 5,436,529, Patent No. 5,982,106, and other patents which would justify a Court and/or jury to award Practical Innovations, Inc. and Andrew Bobel treble (triple) damages and attorney fees against GE.

We, therefore, request that GE remedy this matter as soon as possible by negotiating a license with Practical Innovations, Inc. and Andrew Bobel. Otherwise, please provide us with written assurances that GE will take immediate steps to stop any such infringing activities in violations of the patent laws in the United States by ceasing and desisting directly or indirectly from manufacture, sale, marketing, distribution, and/or supply of such infringing fluorescent ballasts which include self-protected series resonant

LBC000014

electronic energy converters, control and protection circuits for electronic ballasts, or other inventions, either by itself or through its affiliates and/or distributors.

This is a serious matter to Practical Innovations, Inc. and Andrew Bobel and we believe it can have far-reaching detrimental consequences for General Electric Company, its affiliates and/or its customers, if not immediately remedied. If the above objectives are not accomplished in a timely basis in 30 calendar days, we will have no alternative but to take whatever steps are necessary to assure that our valuable proprietary rights are protected.

I would appreciate your prompt reply and cooperation in resolving this matter in an amicable manner.

Very truly yours,

Andrew Bobel

Enclosures

LBC000015

A8482

JTX 51: LETTER FROM THOMAS W. TOLPIN TO PATRICK A. SULLIVAN,
DATED SEPTEMBER 14, 2005

WELSH & KATZ, LTD.

Attorneys at Law

120 SOUTH RIVERSIDE PLAZA - 22ND FLOOR
CHICAGO, ILLINOIS 60606-3912

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Writer's E-mail

twolpin@welshkatz.com

September 14, 2005

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CONFIRMATION

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J. ARON CARMANIAN
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WALLACE L. OLIVER, Ph.D.
LAURA A. LABETS, Ph.D.

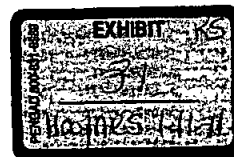
DONALD L. WELSH (1928-1988)

* ALSO ADMITTED IN DISTRICT OF COLUMBIA
** ALSO ADMITTED IN ALABAMA

By Federal Express
Facsimile (615) 316-5162

Mr. Patrick A. Sullivan
Chairman and Chief Executive Officer
Universal Lighting Technologies, Inc.
26 Century Boulevard, Suite 500
Nashville, TN 37214-3683

License Proposal
Universal Lighting Technologies
Our Ref. 9928/95255



Dear Mr. Sullivan:

We represent Practical Innovations, Inc., a Delaware Corporation, of Lake Forest, Illinois and its President, Andrzej (Andrew) Bobel who have developed, originated, invented and improved control and protection circuits for electronic ballasts, self-protected series resonant electronic energy converters, inverters, fluorescent lamps and light sources, and other circuitry, light equipment and devices therefore, as well as methods for manufacturing and using the preceding, which are protected under Bobel U.S. Patent No. 5,436,529 (copy enclosed) and other U.S. patents.

It has come to the attention of Practical Innovations, Inc. and Andrew Bobel that Universal Lighting Technologies is manufacturing, selling, marketing, distributing and/or supplying ballasts for fluorescent lighting which include control and protection circuits for electronic ballasts, under the trademarks and brand names Universal®, Triad®, or Signa®, which are covered by Bobel U.S. Patent

WASHINGTON OFFICE
CRYSTAL PLAZA ONE - SUITE 208 - 2001 JEFFERSON DAVIS HIGHWAY - ARLINGTON, VIRGINIA 22202-3603 - TELEPHONE (703) 419-4777

JOINT EXHIBIT
NO. 51

PATTERSON000013

A8528

Mr. Patrick A. Sullivan
Chairman and Chief Executive Officer
Universal Lighting Technologies, Inc.
September 14, 2005
Page 2

No. 5,436,529. This has occurred without the authorization of Practical Innovations, Inc. and Andrew Bobel.

Practical Innovations, Inc. and Andrew Bobel are willing to offer a license to Universal Lighting Technologies for Bobel U.S. Patent No. 5,436,529 under reasonable terms and conditions.

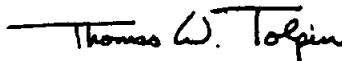
Without a license from Practical Innovations, Inc. and Andrew Bobel, courts and juries in the United States would likely consider Universal Lighting Technologies continued manufacture, sale, marketing, distribution, and/or supply of such ballasts which include control and protection circuits for electronic ballasts to amount to intentional and willful infringement of Bobel U.S. Patent No. 5,436,529, which would justify a Court and/or jury to award Practical Innovations, Inc. and Andrew Bobel treble (triple) damages and attorney fees against Universal Lighting Technologies.

We, therefore, request that Universal Lighting Technologies remedy this matter as soon as possible by negotiating a license with Practical Innovations, Inc. and Andrew Bobel. Otherwise, please provide us with written assurances that Universal Lighting Technologies will take immediate steps to stop any such infringing activities in violations of the patent laws in the United States by ceasing and desisting directly or indirectly from manufacture, sale, marketing, distribution, and/or supply of such infringing fluorescent lighting and control and protection circuits for electronic ballasts, either by itself or through its through its affiliates and/or distributors.

This is a serious matter and of grave concern to Practical Innovations, Inc. and Andrew Bobel and we believe it can have far-reaching detrimental consequences for Universal Lighting Technologies, its affiliates and/or its distributors, if not immediately remedied. If the above objectives are not accomplished in a timely basis in 20 calendar days, we will have no alternative but to take whatever steps are necessary on behalf of Practical Innovations, Inc. and Andrew Bobel to assure that their valuable proprietary rights are protected.

We would appreciate your prompt reply and cooperation in resolving this matter in an amicable manner. In the meantime, if you have any questions, please contact us.

Very truly yours,



Thomas W. Tolpin

TWT/mb
Enclosures

cc Practical Innovations, Inc.
Andrew A. Bobel - by e-mail

PATTERSON000014

JTX 52: LETTER FROM MARK PATTERSON TO THOMAS W. TOLPIN,
DATED OCTOBER 7, 2005

Registered Patent Attorneys

Mark J. Patterson

J.C. Woddey, Jr.

Edward D. Lancaster, Jr.

Luzian Wayne Benvers

James R. Cariglio

Emily A. Shouse

Larry W. Brantley

Mark B. Allard

Phillip E. Walker

Howard H. Bayless

Jason L. Hornkohl

Patent Attorneys
in Tennessee



Waddey & Patterson P.C.

Intellectual Property Law • Patents • Trademarks • Enforcement

October 7, 2005

Thomas W. Tolpin, Esq.
Welsh & Katz, Ltd.
120 South Riverside Plaza, 22nd Floor
Chicago, IL 60606-2913

RE: UNIVERSAL LIGHTING TECHNOLOGIES, INC.
YOUR REFERENCE NO.: 9928/95255
OUR DOCKET NO.: N8226

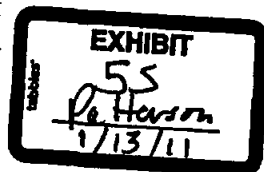
Dear Mr. Tolpin:

This firm represents Universal Lighting Technologies, Inc. ("Universal") in intellectual property law matters. For that purpose, your letter dated September 14, 2005, addressed to Patrick Sullivan regarding your client, Practical Innovations, Inc. and Andrew Bobel's U.S. Patent No. 5,436,529 has been forwarded to my office for review and consideration.

Your letter alleges that Universal is manufacturing and selling products that infringe U.S. Patent No. 5,436,529. However, your letter does not identify and particular products that are alleged to infringe the '529 Patent. As you probably know, Universal sells hundreds of different ballast models. (see www.universalballast.com) We assume that you have examined and identified at least some of these ballast models as a basis for making the infringement allegation. To allow us to efficiently conduct our investigation of your allegations, please identify for us the Universal ballast model(s) that you believe infringe the '529 Patent. Please also identify the claim(s) of the '529 Patent that you believe are infringed.

Please be assured that once we have completed our research into this matter, we will respond accordingly.

Office of
Andrew J. Horn
200 Union Avenue
Suite 500
Nashville, TN 37203
256.555.1100
Fax: 56.555.4400



JOINT EXHIBIT
NO. 52

Roundabout Plaza • 1600 Division Street • Suite 500 • Nashville, TN 37203
615.242.2400 • Fax: 615.242.2221 • www.iplawgroup.com

PATTERSON000018

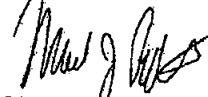
Thomas W. Tolpin, Esq.
October 7, 2005
Page 2

In the meantime, if you should have any questions, please feel free to contact our offices.

Thank you,

Very truly yours,

WADDEY & PATTERSON



Mark J. Patterson
mjp@iplawgroup.com

MJP/pas

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PATTERSON000019

A8532

JTX 53: LETTER FROM THOMAS W. TOLPIN TO MARK J. PATTERSON,
DATED OCTOBER 20, 2005

WELSH & KATZ, LTD.

Attorneys at Law

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RECEIVED

DEC 22 2005

Writer's E-mail: wtolpin@welshkatz.com

WADDEY AND PATTERSON, P.C.

October 20, 2005

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LAURA A. LABERGE, Ph.D.

DONALD L. WELSH (1928-1996)

* ALSO ADMITTED IN DISTRICT OF COLUMBIA
** ALSO ADMITTED IN ALABAMA

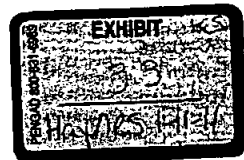
By Facsimile (615) 242-2221
Air Mail

Mr. Mark J. Patterson
Waddey & Patterson P.C.
Roundabout Plaza
1600 Division Street, Suite 500
Nashville, TN 37202

REMINDER

December 5, 2005

License Proposal
Universal Lighting Technologies, Inc.
Your Docket No. N8226
Our Ref. 9928/95255



Dear Mr. Patterson:

Thank you for your letter of October 7, 2005 about the license proposal of Practical Innovations, Inc. and Mr. Andrew Bobel concerning Bobel U.S. Patent No. 5,436,529 for a Control and Protection Circuit for Electronic Ballast.

In response to your request in your letter of October 7, 2005, we enclose a list of the ballast models of Universal Lighting Technologies, Inc. that Practical Innovations, Inc. believes are covered by Bobel U.S. Patent No. 5,436,529 for a Control and Protection Circuit for Electronic Ballast.

In further response to your request in your letter of October 7, 2005, Practical Innovations, Inc. believes that the enclosed ballast models of Universal Lighting Technologies, Inc. are covered by U.S.

JOINT EXHIBIT
NO. 53

WASHINGTON OFFICE
CRYSTAL PLAZA ONE • SUITE 206 • 2001 JEFFERSON DAVIS HIGHWAY • ARLINGTON, VIRGINIA 22202-3803 • TELEPHONE (703) 418-4777

PATTERSON000023

A8534

Mr. Mark J. Patterson
Wadley & Patterson P.C.
October 20, 2005
Page 2

Patent claims 1-6, 10-12 and 17 of Bobel U.S. Patent No. 5,436,529 for a Control and Protection Circuit for Electronic Ballast. The U.S. Patent claims 1-6, 10-12 and 17 of Bobel U.S. Patent No. 5,436,529 for a Control and Protection Circuit for Electronic Ballast are listed hereinafter for your consideration.

1. An energy conversion device employing an oscillating resonant converter producing oscillations, having DC input terminals producing a control signal and adapted to power at least one gas discharge lamp having heatable filaments, the device comprising:

voltage source means providing a constant or variable magnitude DC voltage between the DC input terminals;

output terminals connected to the filaments of the gas discharge lamp;

control means capable of receiving control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective.

2. The device according to claim 1 wherein the resonant converter comprises a capacitor and an inductor connected in series via an intermediate node.

3. The device according to claim 2 wherein the control means is connected to receive the control signal from the intermediate node.

4. The device according to claim 3 wherein the control means receives the control signal from the DC input terminals and the signal flows through the output terminals and the intermediate node.

5. The device according to claim 1 wherein the direct current blocking means includes a capacitor and is connected effectively across at least one heatable filament of at least one gas discharge lamp.

6. An energy conversion device employing oscillating resonant converter, having DC input terminals and adapted to power at least one gas discharge lamp having heatable filaments, and comprising:

voltage source means able to provide constant or variable magnitude of a

PATTERSON000024

Mr. Mark J. Patterson
Wadley & Patterson P.C.
October 20, 2005
Page 3

DC voltage between the DC input terminals;

output terminals for connection to the filaments of at least one gas discharge lamp;

one-shot trigger means coupled to the DC input terminals and to the resonant converter, and (i) able to receive a trigger control signal from the DC input terminals, and (ii) operable to provide one trigger pulse to effectively initiate the oscillations;

one-shot disable means magnetically coupled to the resonant converter, and (i) able to receive a disable control signal from the resonant converter, and (ii) operable to provide one disable pulse to effectively stop the oscillations; and

direct current blocking means coupled to the output terminals and effectively across at least one heatable filament of at least one lamp, and operable to stop flow of the trigger control signal from the DC input terminals, whenever at least one end of at least one lamp is removed from the output terminals or the lamp is defective.

10. Device according to claim 6 wherein the direct current blocking means include a capacitor and are connected effectively across at least one heatable filament of at least one gas discharge lamp.

11. Device according to claim 6 wherein the direct current blocking means include a semiconductor diode and are connected effectively across at least one heatable filament of at least one gas discharge lamp.

12. An energy conversion device employing at least one oscillating resonant converter, having DC voltage input terminals, adapted to power at least one gas discharge lamp, and comprising:

voltage source means able to provide constant or variable magnitude of a DC voltage between the DC input terminals;

output terminals for connection to at least one gas discharge lamp;

one-shot trigger means coupled to the DC input terminals and to the output terminals, and (i) able to receive a trigger control signal from the DC input terminals, and (ii) operable to provide one trigger pulse to effectively initiate the oscillations;

PATTERSON000025

Mr. Mark J. Patterson
Wadley & Patterson P.C.
October 20, 2005
Page 4

one-shot disable means magnetically coupled to each and every one of the resonant converters, and (i) able to receive a disable control signal from each and every one of the resonant converters, and (ii) operable to provide one disable pulse to effectively stop the oscillations; and

disconnect means coupled to the DC input terminals and to the output terminals, and operable to stop flow of the trigger control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals.

17. An energy conversion device employing at least one oscillating resonant converter, having DC input terminals and adapted to power at least one gas discharge lamp having heatable filaments, and comprising:

voltage source means able to provide constant or variable magnitude of a DC voltage between the DC input terminals;

output terminals for connection to the filaments of at least one gas discharge lamp;

one-shot trigger means coupled to the DC input terminals and to each and every one of the resonant converters, and (i) able to receive a trigger control signal from the DC input terminals, and (ii) operable to provide one trigger pulse to effectively initiate the oscillations;

one-shot disable means magnetically coupled to each and every one of the resonant converters, and (i) able to receive a disable control signal from each and every one of the resonant converters, and (ii) operable to provide one disable pulse to effectively stop the oscillations; and

direct current blocking means coupled to the output terminals and effectively across at least one heatable filament of at least one lamp, and operable to stop flow of the trigger control signal from the DC input terminals, whenever at least one end of at least one lamp is removed from the output terminals or the lamp is defective.

18. An energy conversion device employing an oscillating resonant converter, having DC input terminals and adapted for powering at least one gas discharge lamp having heatable filaments, the device comprising:

voltage source means able to provide a constant or variable magnitude DC

PATTERSON000026

Mr. Mark J. Patterson
Wadley & Patterson P.C.
October 20, 2005
Page 5

voltage between the DC input terminals;

output terminals for connection to the filaments of the gas discharge lamp;

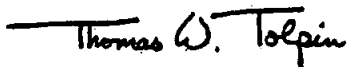
control means able to receive control signals from the DC input terminals and from the resonant converter, and operable to effectively initiate the oscillations, and to effectively stop the oscillations of the converter; and

direct current blocking means coupled to the output terminals and operable to stop flow of the control signal from the DC input terminals, whenever at least one gas discharge lamp is removed from the output terminals or is defective wherein the direct current blocking means includes a semiconductor diode and is connected effectively across at least one heatable filament of at least one gas discharge lamp.

Practical Innovations, Inc. reserves the right to later include one or more of U.S. Patent claims 7-9 and 13-16 of Bobel U.S. Patent No. 5,436,529 for a Control and Protection Circuit for Electronic Ballast, if Practical Innovations, Inc. subsequently learns of further information concerning the ballasts of Universal Lighting Technologies, Inc. that make it then appropriate to include those U.S. Patent claims.

Thank you for your assistance in this matter.

Very truly yours,



Thomas W. Tolpin

TWT/mb
Enclosures

cc Practical Innovation, Inc.
Mr. Andrew Bobel

PATTERSON000027

A8538

**Ballasts of Universal Lighting Technologies, Inc.
Covered by Bobel U.S. Patent No. 5,436,529
October 20, 2005**

1. MICRO-STAR™ ELECTRONIC BALLASTS MODELS:

CBT113L-120x
CBT126L-120x
CBT213L-120x
CBT218L-120Xc
CBT-132L-120S
CBT-122L-120S
CBT140L-120S

The Microstar family includes ballasts for 7 to 26 Watt CFL lamps and 8 to 28 Watt linear T5 lamps.

And any new model of this group

2. ELECTRONIC BALLASTS FOR COMPACT FLUORESCENT LAMPS:

C242UNVxxx
C242/347xxx
C213UNV
CT213UNVxxx
C213/347xxx
C218UNVxxx
C218/347xxx
C2642UNVxxx
C2642/347xxx
ES3020G
C270UNVxxx

And any new models of this group.

3. ELECTRONIC BALLASTS FOR LONG TWIN-TUBE LAMPS:

B224PUNV-C
B239PUNV-D
B254P347-D
B254PUNV-D
B454PUNV-E

And any new models of this group

4. ANALOG DIMMING BALLASTS:

B132R120V5
B132R277V5
B132R347V5
B232SR120V5
B232SR277V5
B232SR347V5
B332SR120V5
B332SR277V5-E
B332SR277V5H-E
B432P277V5-E

PATTERSON000028

**Ballasts of Universal Lighting Technologies, Inc.
Covered by Bobel U.S. Patent No. 5,436,529
October 20, 2005**

B432P277VSH-E

B432SR277V5

And any new models in this group

5. LIGHT LEVEL SWITCHING DIMMING BALLASTS:

B132SR120S30

B132SR277S30

B132SR120S50

B132SR277S50

B232SR120S30

B232SR277S30

B232SR120S50

B232SR277S50

B332SR120S30

B332SR277S30

B332SR120S50

B332SR277S50

B228PUNVS50-D

And any new model in this group

6. MULTI KITS PRODUCTS CONTAINING ELECTRONIC BALLASTS:

C213UNVME000K

C218UNVME000K

C2642UNVME000K

7. ACCUSTART "8"™ ELECTRONIC BALLASTS:

B132PUNVHP-A

B232PUNVHP-A

B332PUNVHP-A

B432PUNVHP-A

8. ACCUSTART "5"™ ELECTRONIC BALLASTS:

B224PUNV-C

B228PUNV-C

B239PUNV-D

B254P347-D

B254PUNV-D

B254PHRV-E

B454PUNV-E

9. ULTIM "5"™ ELECTRONIC BALLASTS:

B254IHRV-E

B254IUNV-E

B454IUNV-E

PATTERSON000029

**Ballasts of Universal Lighting Technologies, Inc.
Covered by Bobel U.S. Patent No. 5,436,529
October 20, 2005**

10. DALIPRO™ DIMMING ELECTRONIC BALLASTS:

DaliPro Ballast
B113PUNVDV1
B213PUNVDV1
B114PUNVDV1
B214PUNVDV1
B125PUNVDV1
B225PUNVDV1
B154PUNVDV1
B254PUNVDV1
C115PUNVDV3
C215PUNVDV3
C125PUNVDV3
C225PUNVDV3
C132PUNVDV3
C232PUNVDV3
C142PUNVDV3
C242PUNVDV3
C145PUNVDV3
C245PUNVDV3

PATTERSON000030

**Ballasts of Universal Lighting Technologies, Inc.
Covered by Bobel U.S. Patent No. 5,436,529
October 20, 2005**

11. ADDRESSPRO™ - DIMMING ELECTRONIC BALLASTS:

AddressPro	
Former ESI Model # (Description)	ULI Item ID
ES-1-TS-14-UNV-K-DIM-D	ES5327B000C
ES-1-TS-14-UNV-B-DIM-D	ES5341B000C
ES-1-TS-17-UNV-K-DIM-D	ES5338B000C
ES-1-TS-17-UNV-B-DIM-D	ES5343B000C
ES-1-TS-18-UNV-K-DIM-D	ES5317B000C
ES-1-TS-18-UNV-B-DIM-D	ES5315B000C
ES-1-TS-32/15-UNV-K-DIM-D	ES5318B000C
ES-1-TS-32/15-UNV-B-DIM-D	ES5316B000C
ES-1-TS-14-UNV-K-DIM-D	ES5344B000C
ES-1-TS-14-UNV-K-DIM-D	ES5345B000C
ES-1-TS-14-UNV-K-DIM-D	ES5346B000C
ES-1-TS-14-UNV-K-DIM-D	ES5347B000C
ES-1-TS-14-UNV-K-DIM-D	ES5348B000C
ES-1-TS-14-UNV-K-DIM-D	ES5349B000C
ES-1-TS-14-UNV-K-DIM-D	ES5350B000C
ES-1-TS-14-UNV-K-DIM-D	ES5351B000C
ES-1-TS-14-UNV-K-DIM-D	ES5352B000C
ES-1-CFT-14-UNV-BMT-DIM-D	ES5008BMT000C
ES-1-CFT-14-UNV-BMT-DIM-D	ES5009BMT000C
ES-1/1-CFQ-14-UNV-GT-DIM-D	ES5001GT000C
ES-1/1-CFQ-14-UNV-BT-DIM-D	ES5002HT000C
ES-1/1-CFQ-14-UNV-GT-DIM-D	ES5003GT000C
ES-1/1-CFQ-14-UNV-BT-DIM-D	ES5004HT000C
ES-1/1-CFQ-14-UNV-GT-DIM-D	ES5005GT000C
ES-1/1-CFQ-14-UNV-BT-DIM-D	ES5006HT000C
ES-1-CFH-12/31/14-UNV-GT-DIM-D	ES5000GT000C
ES-1-CFH-12/31/14-UNV-BT-DIM-D	ES5000HT000C

12. "0-10V" DIMMING BALLASTS -see the following page

PATTERSON000031

Ballasts of Universal Lighting Technologies, Inc.
Covered by Bobel U.S. Patent No. 5,436,529
October 20, 2005

0 to 10V Dimming

Former ESI Model # (Description)	ULT Item ID
ES-1-T8-17-UNV-K-DIM-10	ES5818K000C
ES-1-T8-17-UNV-B-DIM-10	ES5833B000C
ES-2-T8-17-UNV-K-DIM-10	ES5817K000C
ES-2-T8-17-UNV-B-DIM-10	ES5834B000C
ES-1-T8-32/25-UNV-B-DIM-10	ES5821B000C
ES-1-T8-32/25-UNV-K-DIM-10	ES5835K000C
ES-2-T8-32/25-UNV-B-DIM-10	ES5822B000C
ES-2-T8-32/25-UNV-K-DIM-10	ES5836K000C
ES-1-T5-14-UNV-K-DIM-10	ES5849K000C
ES-2-T5-14-UNV-K-DIM-10	ES5851K000C
ES-1-T5-21-UNV-K-DIM-10	ES5839K000C
ES-2-T5-21-UNV-K-DIM-10	ES5861K000C
ES-1-T5-28-UNV-K-DIM-10	ES5846K000C
ES-2-T5-28-UNV-K-DIM-10	ES5847K000C
ES-1-T5-35-UNV-K-DIM-10	ES5853K000C
ES-1-T5-54-UNV-K-DIM-10	ES5844K000C
ES-1-CFT-40-UNV-BM-DIM-10	ES5006BM000C
ES-2-CFT-40-UNV-BMT-DIM-10	ES5007BMT000C
ES-2/1-CFQ-13-UNV-GT-DIM-10	ES5011GT000C
ES-2/1-CFQ-13-UNV-HT-DIM-10	ES5011HT000C
ES-2/1-CFQ-18-UNV-GT-DIM-10	ES5012GT000C
ES-2/1-CFQ-18-UNV-HT-DIM-10	ES5012HT000C
ES-2/1-CFQ-26-UNV-GT-DIM-10	ES5013GT000C
ES-2/1-CFQ-26-UNV-HT-DIM-10	ES5013HT000C

PATTERSON000032

JTX 60: E-MAIL FROM MARK PATERSON TO ANDREW BOBEL,
DATED OCTOBER 5, 2006

From: Mark Patterson
Sent: Thursday, October 05, 2006 1:45 PM
To: abobel@neptunlight.com; abobel@yahoo.com
Subject: Universal Lighting Technologies, Inc.
Dear Mr. Bobel:

I am contacting you directly on behalf of Universal Lighting Technologies, Inc. ("Universal") because I did not receive a reply to inquiries I sent earlier this year to your former attorneys about their ongoing representation of you or your company, Practical Innovations, Inc. If you are still represented by counsel in relation to your allegations against Universal, please forward this message to those attorneys.

Universal has become aware that you have been directing allegations of patent infringement against electronic ballasts sold by General Electric Company ("GE"). GE has notified Universal of these allegations because Universal supplies certain electronic ballast products to GE. However, not all GE electronic ballast products are supplied by Universal.

Previously, you and your company had communicated with Universal about allegations of infringement of U.S. Patent No. 5,436,529 ("the '529 Patent"). Universal initially responded to those allegations by asking you to identify the claims of the '529 Patent that you alleged were infringed and the specific Universal products that you alleged infringed those claims. After Universal received this clarifying information from you, Universal and its patent counsel thoroughly investigated the allegations. As a result, Universal concluded that it was not infringing the asserted claims of the '529 Patent. One of the bases for this conclusion was that all of the asserted claims of the '529 Patent were invalid under 35 U.S.C. §102.

According to GE, you have alleged that its electronic products infringe both the '529 Patent as well as U.S. Patent No. 5,982,106 ("the '106 Patent"). To my knowledge, you have never alleged that any products made or sold by Universal infringe the '106 Patent.

Universal would like to investigate allegations made against GE for infringement of the '106 Patent, but only if those allegations include products supplied to GE by Universal. The only reasonable way for that to occur is for you to: (a) specify the claims of the '106 Patent that you allege are infringed by GE products; and (b) specify the GE products that you allege infringe the asserted claims of the '106 Patent. Universal can then use your identification of accused GE products as a basis for determining whether any GE products supplied by Universal are accused of infringing the '106 Patent. At this point, based on your prior communications directly with Universal, we must assume that no Universal products (whether sold by Universal or by GE) are alleged to infringe the '106 Patent.

Regarding the '529 Patent, Universal has concluded that all claims you have previously asserted against Universal products are invalid. If there are different claims asserted against GE products, please identify those claims and identify the specific GE products that you allege infringe those claims. Universal can then use that information to determine if it needs to investigate any other claims of the '529 Patent in relation to products supplied by Universal. Without such clarifying information, Universal will simply rely on its previous investigation.

Please contact me directly (or through your attorneys) if you have any other information that you believe that Universal should consider at this time.

Mark J. Patterson
Wadley & Patterson, P.C.
1600 Division Street, Suite 500
Nashville TN 37203
615-242-2400
615-242-2221 (fax)

JOINT EXHIBIT
NO. 60

Patterson000048

mjp@iplawgroup.com

NOTICE: This message (with any attachments) is confidential and may constitute an attorney-client or other privileged communication. If you have received this message in error, please notify me immediately by telephone and by electronic mail. Thank you.

Patterson000049

A8563

JTX 71: UNITED STATES PATENT NO. 7,015,652 B2

US 7,015,652 B2

9

nation of resistors and capacitors generates an AC voltage signal across EOLL resistor 250 that is representative of the peak-to-peak AC voltage across the lamp load 70.

EOLL DC reference voltage circuit 190 includes an EOLL rectifier circuit 270 (see FIG. 8e), which, in a preferred embodiment simply includes an EOLL diode 280 (or one diode from a two-diode package) and an EOLL rectifier circuit charging capacitor (or EOLL time delay circuit) 272. The EOLL diode 280 rectifies the AC voltage signal applied to the EOLL diode 280 and generates a DC charging current signal that charges EOLL rectifier circuit charging capacitor 272. The resulting DC voltage signal across EOLL rectifier circuit charging capacitor 272, after it has been charged to a predetermined DC voltage level, is the EOLL DC voltage signal representative of the peak-to-peak voltage across the lamp load 70.

The time required to charge the EOLL rectifier circuit charging capacitor 272 generates a time delay between the time that the AC voltage signal across EOLL resistor 250, which is representative of the peak-to-peak AC voltage across the lamp load 70, exceeds a predetermined reference output voltage level and the time that the EOLL DC voltage signal is generated. Or, in other words, the EOLL rectifier circuit charging capacitor 272 causes the EOLL DC voltage signal to be generated only after the AC voltage across the lamp 70 has exceeded the predetermined reference voltage level for a predetermined time period. This delay is necessary in order to prevent transient high voltage conditions across the lamp load 70, which are not caused by an end of lamp life condition in the lamp load 70, from falsely triggering the EOLL control signal.

The EOLL comparison circuit 170 includes an EOLL DC comparison circuit 290 and an optional EOLL filter/protection circuit 300. The EOLL DC comparison circuit 290 is operable to compare the EOLL DC voltage signal representative of the peak-to-peak voltage across the lamp load 70 to a predetermined EOLL DC reference voltage level and to generate the EOLL control signal when the DC voltage signal exceeds the predetermined DC reference voltage level. The EOLL filter/protection circuit 300 is operable to filter the EOLL control signal so that it does not include noise and to prevent excessive current from flowing to the inverter driver integrated chip 110.

In a preferred embodiment, the EOLL DC comparison circuit 290 includes an EOLL Zener diode 310 (or EOLL reference component 310) that is connected to the EOLL diode 280 and the EOLL rectifier circuit charging capacitor 272. As is well known in the prior art, a Zener diode is designed to prevent current from passing through the diode unless the breakdown voltage of the diode has been exceeded. In this case, the breakdown voltage of EOLL Zener diode 310 (also referred to as the EOLL reference component 310) is chosen to be higher than the voltage across the EOLL rectifier circuit charging capacitor 272 during normal operation. Thus, when the EOLL DC voltage signal on the EOLL rectifier circuit charging capacitor 272 exceeds the breakdown voltage of EOLL Zener diode 310 plus the reference voltage on shut-down pin (pin 8 EN1) on inverter driver integrated chip 110, the system 10 interprets this condition as an indication that the peak-to-peak voltage across the lamp load 70 has exceeded the predetermined EOLL DC voltage level. In other words, the EOLL Zener diode 310 is used to set the predetermined EOLL reference voltage by using its breakdown voltage.

One skilled in the art will recognize that the EOLL Zener diode 310 is acting like a voltage controlled switch in the EOLL DC comparison circuit 290 and that other types of

10

voltage controlled switches, such as diacs or transistors, may be used as well. As a result, the EOLL Zener diode 310 may be more generally referred to as EOLL voltage controlled switch 310 and the breakdown voltage may be referred to as the EOLL switching voltage.

To filter the EOLL control signal and to prevent excessive current from flowing to the inverter driver integrated chip 110, the EOLL filter/protection circuit 300 includes an EOLL filter capacitor 302 connected to the EOLL Zener diode 310. When the breakdown voltage of EOLL Zener diode 310 is exceeded, a DC current flows through the EOLL Zener diode 310 and charges EOLL filter capacitor 302. This capacitor cannot be charged instantaneously and the time required to charge the capacitor prevents, or filters out, noise that may be included with the EOLL control signal.

Once the EOLL control signal is generated, it is supplied to and used by the inverter driver integrated chip 110 (see FIG. 8c) to control the output of the inverter circuit 40. In a preferred embodiment, the inverter driver integrated chip 110 is operable to shut down the inverter circuit 40 in response to the EOLL control signal. In other embodiments, the inverter driver chip 110 may be operable to simply reduce the amount of power that is output by the inverter circuit 40. This is typically done by increasing the oscillating frequency of the inverter circuit 40 to reduce the output lamp current and lamp power.

Turning now to FIGS. 5 and 8f, the overheating protection circuit 130 is operable to sense the operating temperature of the ballast 10 and to generate an overheating control signal when the sensed temperature exceeds a predetermined temperature level for a predetermined time period. As was the case with the EOLL control signal, the overheating control signal can be used to cause the ballast 10 to enter a protected state, i.e., an overheating protected state, so that the ballast 10 and the lamp load 70 cannot be damaged by the undesired overheat.

To accomplish this function, the overheating protection circuit 130 is operable to generate an overheating reference voltage signal that is representative of a normal operating temperature of the ballast 10 and to compare that reference voltage to a predetermined overheating reference voltage. When the overheating reference voltage generated by the overheating protection circuit 130 exceeds the overheating reference voltage plus the reference voltage on shut-down pin (pin 8 EN1) on inverter driver integrated chip 110, the overheating protection circuit 130 generates an overheating control signal. The overheating control signal is then supplied to the inverter microcontroller 110, which uses it to either shut down the inverter circuit 40 or reduce the amount of power being delivered to the lamp load 70 as discussed above with regard to the EOLL protection circuit 120.

Unlike prior art overheating protection circuits, the overheating protection circuit 130 of the present invention is adapted to generate an overheating control signal only after an overheating condition occurs and using an overheating reference component. At normal ballast operation temperature, the overheating control signal is essentially nothing and, when an overheating condition occurs, the overheating control signal increases after the breakdown voltage of Zener is reached up to a predetermined overheating reference voltage. This allows the overheating protection circuit of the present invention to more accurately sense overheating conditions when compared to prior art overheating protection circuits. This is true because prior art overheating protection circuits always generate some significant overheating control signal (for instance, at least 50% of the trig

JTX 76: LIST OF ACCUSED ULT PRODUCTS

LIST OF ACCUSED ULT PRODUCTS

Product	Generation
Linear Group 1	
B254PUNV-D	D
B228PUNV90-C	A
B228PUNV-C	A
B232PUNVHP-A	A
B254PUNV-D	B
B254PUNV-D	C
B254PUNVHB-D	See Parent
B132PUNVHP-A	A
Linear Group 2	
B224PUNV-C	A
B239PUNV-D	B
B254P347D	B
Linear Group 3	
B332PUNVHP-A	A
Linear Group 4	
B228PUNV115-D	C
Compact Fluorescent Lamp Group 1	
C2642UNVxxx ¹	E
C213UNVxxx	B
C218UNVxxx	
C213UNVxxx	C
C218UNVxxx	
C242UNVxxx	C
C2642UNVxxx	D
Compact Fluorescent Lamp Group 2	
C213UNVxxx	E
C218UNVxxx	
C213UNVxxx	D
C218UNVxxx	
Microprocessor Group 1	
ES5010GT/HT	A
ES5000GT/HT	B
ES5010GT/HT	B
ES5008BM	A
ES5006BM	
ES5827B	A
ES5831B	
ES5821B	
ES5833B	
ES5001GT/HT	A
ES5002GT/HT	
ES5003GT/HT	
ES5011GT/HT	
ES5012GT/HT	
ES5013GT/HT	
ES4800A	A
ES5852K	A
ES5853K	
ES5825K	A
ES5829K	
ES5818K	
ES5835K	

**JOINT EXHIBIT
NO. 76**

¹ "xxx" indicates products that start with the same prefix (e.g., C2642UNV) but have slight variations based on how they are to be installed (e.g. BE, BES, ME, etc). For example, the reference to C2642UNVxxx includes the following products: C2642UNVBE, C2642UNVBES, C2642UNVME and C2642UNVSE.

JTX 81: TECHNICAL DOCUMENTS: LINEAR 3 REPRESENTATIVE PRODUCT

A8844 – A8850 REMOVED DUE TO CONFIDENTIAL MATERIAL

**JTX 182: NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION,
“COMPATIBILITY OF FLUORESCENT LAMPS AND ELECTRONIC BALLASTS IN
FREQUENTLY SWITCHED APPLICATIONS,” AUGUST 18, 2003.**

LSD 18-2003

used, lamp life may not be affected. In either case, energy savings can normally more than offset lamp replacement costs.

Guidelines

The question becomes, how does one choose a ballast and switching scheme combination to minimize loss of lamp life in frequent starting applications?

To achieve acceptable lamp life, the specifier must address switching scenarios and ballast type.

"On Time." NEMA recommends that the minimum lighting "on time" be no less than 15 minutes.² This allows for energy savings when people are out of the room for extended periods of time, but does not shorten lamp life by cycling lamps every time someone steps out of the room momentarily.

Ballast Type. There are three main types of ballasts, each with its own starting characteristic that can affect lamp-life.

Instant-start ballasts are the most efficient and are the most popular *electronic* ballast available today. They are recommended for applications with switching frequencies of less than five cycles per day or where energy savings is considered more important than lamp life. Instant starting can make a ballast very efficient, but it causes the electrodes of the lamp to degrade a little every time the lamp lights compared with programmed start ballasts. An instant-start ballast should start the lamp in the time specified by ANSI.³

Rapid start ballasts are not as efficient as instant start ballast due to additional filament heating power supplied to the lamp, although this additional filament heating can produce longer lamp life in applications where lamp starting occurs less often than every three hours. Like the instant start ballast, they are recommended for applications with switching frequencies of less than five cycles per day. Rapid starting of lamps causes the electrodes of the lamp to degrade a

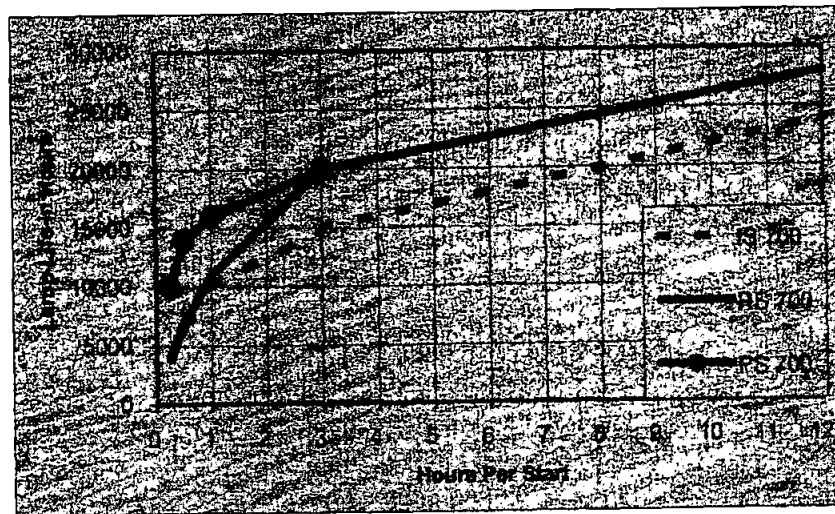
² A product survey performed by the Lighting Research Center found that the vast majority of sensors would permit a minimum "on time" setting of 15 minutes and that many were adjustable to 20 and even 30 minutes. In the event that a given sensor is limited to less than 15 minutes, NEMA recommends setting the sensor to the longest time possible. If lamp life results at the 15-minute setting are unacceptable, then the time should be increased for those sensors with such flexibility. For the complete product survey, see "Specifier Reports—Occupancy Sensors: Motion-sensing Devices for Lighting Controls," National Lighting Product Information Program, Vol. 5, No. 1, October 1998.

³ ANSI C82.11-1993, *High Frequency Fluorescent Lamp Ballast*, and ANSI C82.11 Consolidated-2002, *High Frequency Fluorescent Lamp Ballast—Supplements*.

LSD 18-2003

little every time the lamp lights compared with programmed start ballasts. A rapid start ballast should start the lamp in the time and manner specified by ANSI.⁴

Programmed start ballasts provide the best lamp ignition and longest lamp life. In a programmed start ballast electrodes are preheated prior to ignition resulting in almost no electrode degradation. This allows frequent starts without a significant loss of lamp life as shown in the accompanying graph. See Figure 1. Programmed start ballasts are recommended in applications with frequent starts where extended lamp life is a primary concern.



Note: 700 is the most common color rendering index rating for T8 lamps
IS = instant start; RS = rapid start; PS = programmed start

Figure 1. Lamp Life versus Starting Method⁵

Summary: Recommendations

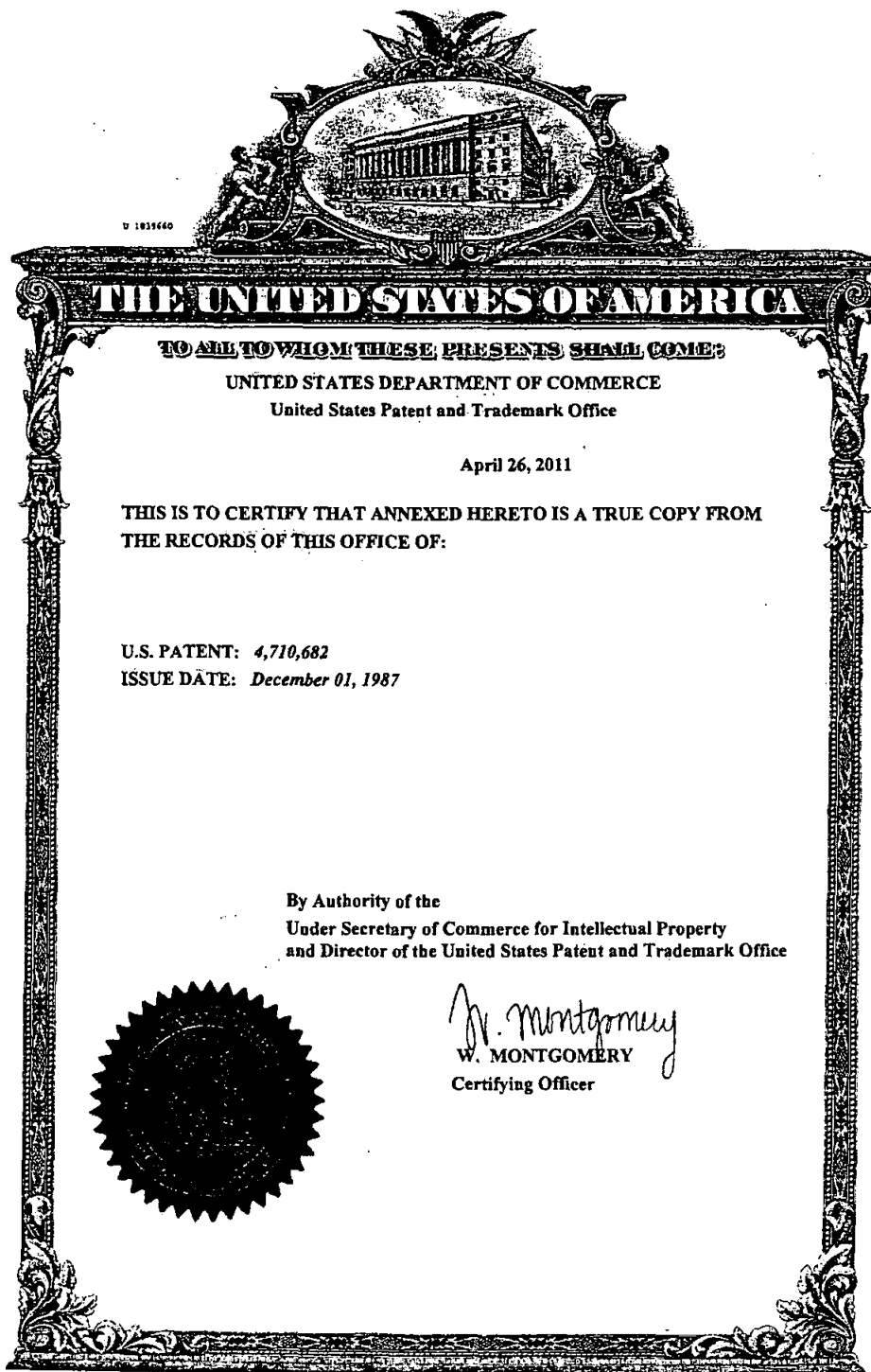
Use the longest practical minimum "ON" time setting for the occupancy sensor and other automatic cycling means (15 minutes is recommended).

Only use ballasts that meet ANSI requirements for lamp ignition.

⁴ *Op. cit.*

⁵ Figure 1 is courtesy of OSRAM SYLVANIA. IS—instant-start ballast, RS—rapid-start ballast, and PS—programmed start ballast.

JTX 188: CERTIFIED COPY OF U.S. PATENT NO. 4,710,682



JOINT EXHIBIT
NO. 188

United States Patent [19][11] **Patent Number:** 4,710,682**Zuchtriegel**[45] **Date of Patent:** Dec. 1, 1987[54] **FLUORESCENT LAMP OPERATING CIRCUIT**[75] **Inventor:** Anton Zuchtriegel, Taufkirchen, Fed. Rep. of Germany[73] **Assignee:** Patent-Treuhand-Gesellschaft für elektrische Glühlampen m.b.H., Munich, Fed. Rep. of Germany[21] **Appl. No.:** 23,456[22] **Filed:** Mar. 9, 1987[30] **Foreign Application Priority Data**

Mar. 14, 1986 [DE] Fed. Rep. of Germany 3608615

[51] **Int. Cl.⁴** H05B 37/00[52] **U.S. Cl.** 315/224; 315/210;
315/226; 315/242; 315/244; 315/290;
315/DIG. 7[58] **Field of Search** 315/224, 226, 290, 242,
315/244, 210[56] **References Cited****U.S. PATENT DOCUMENTS**

4,346,332	8/1982	Walden	315/307
4,438,372	3/1984	Zuchtriegel	315/224
4,477,748	10/1984	Grubbs	315/306
4,481,460	11/1984	Kröning et al.	323/266

OTHER PUBLICATIONS

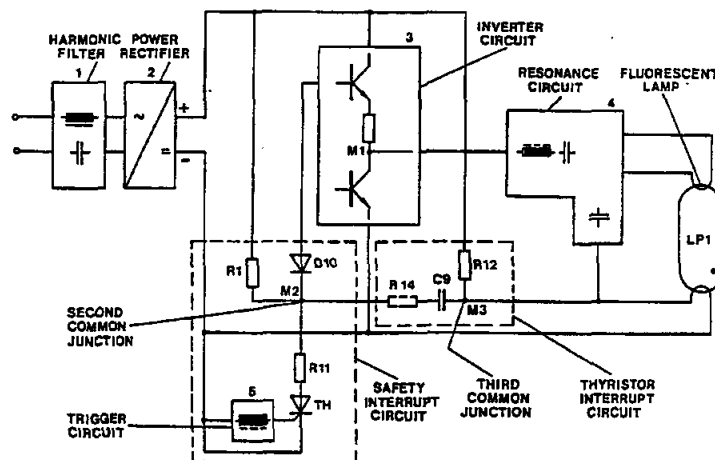
"SIPMOS Transistors", SIEMS Application Notes,

1983, chapter 1.9, "Electronic Ballast for Fluorescent Lamps", pp. 34 et seq.

"Elektronischaltungen", (Electronic Circuits) by Walter Hirschmann, published by SIEMENS, AG, chapter B3.12, Elektronisches Vorschaltgerät für neue Leuchtstofflampen, pp. 147-151.

Primary Examiner—Harold Dixon**Attorney, Agent, or Firm**—Frishauf, Holtz, Goodman & Woodward[57] **ABSTRACT**

A circuit for operating low-pressure discharge lamps at elevated frequency comprises a reconnect circuit which disables the disconnect circuit upon exchange of a defective low-pressure discharge lamp (LP1). The disconnect circuit comprises a diode (D10), a resistor (R11) and a thyristor (TH) together with a trigger circuit (5). The reconnect circuit comprises a capacitor (C9) and a resistor (R12). Upon removal of the defective low-pressure discharge lamp (LP1), the capacitor (C9) is charged over the resistor (R12). Upon insertion of a new low-pressure discharge lamp (LP1), the capacitor (C9) is discharged and recharged in opposite direction and the holding current is removed from the thyristor (TH). This causes the thyristor (TH) to block, and enables the push-pull frequency generator (3) to start oscillating again.

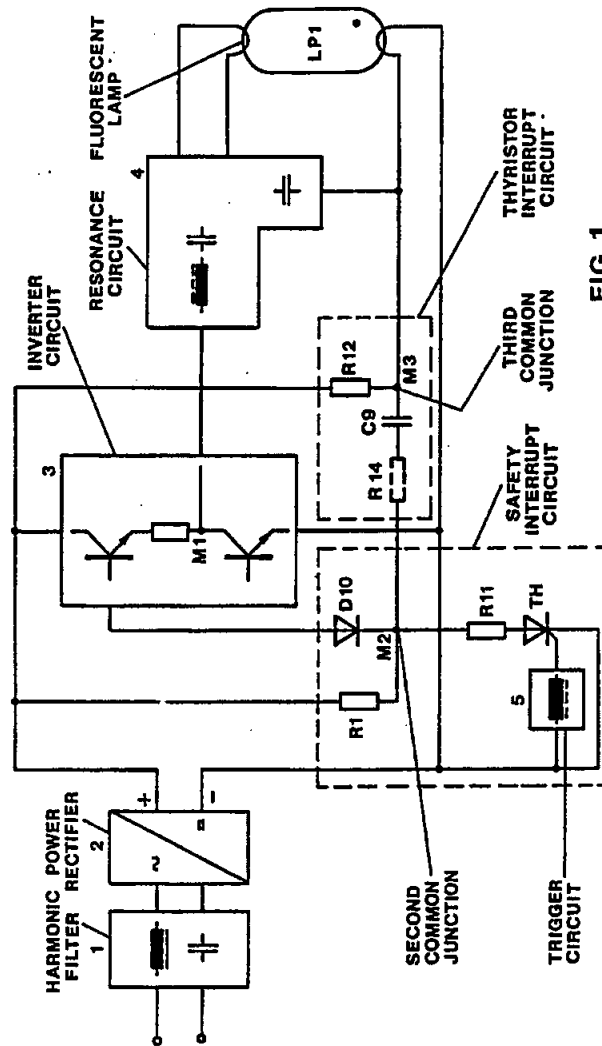
6 Claims, 3 Drawing Figures

U.S. Patent

Dec. 1, 1987

Sheet 1 of 3

4,710,682



U.S. Patent

Dec. 1, 1987

Sheet 2 of 3

4,710,682

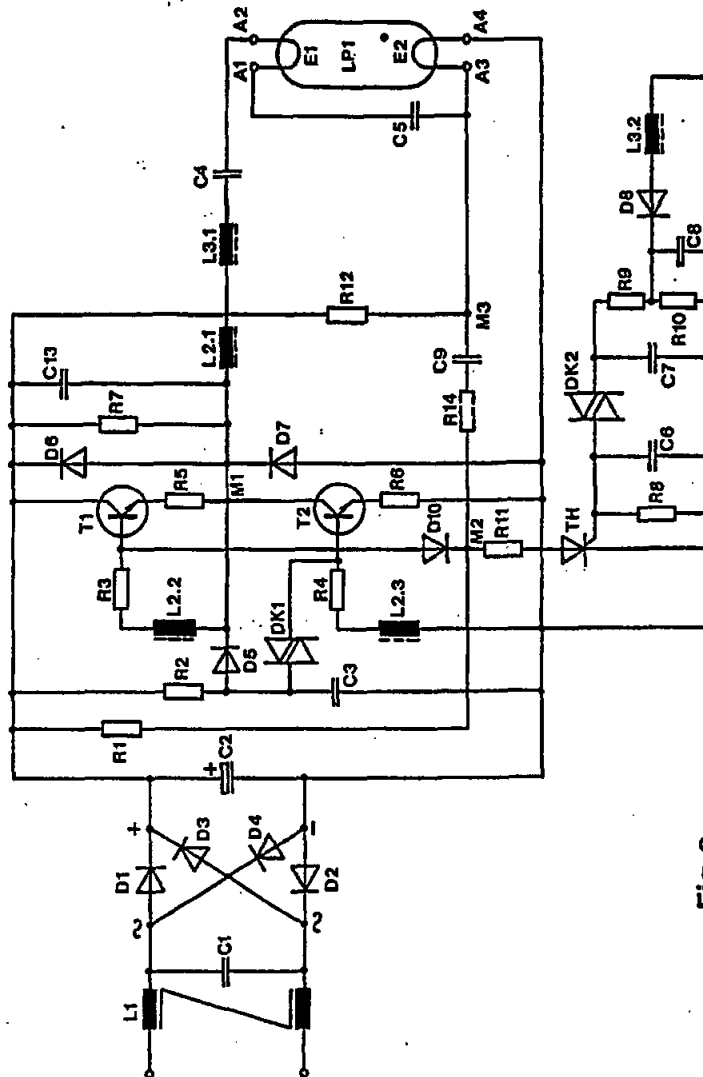


Fig. 2

U.S. Patent

Dec. 1, 1987

Sheet 3 of 3

4,710,682

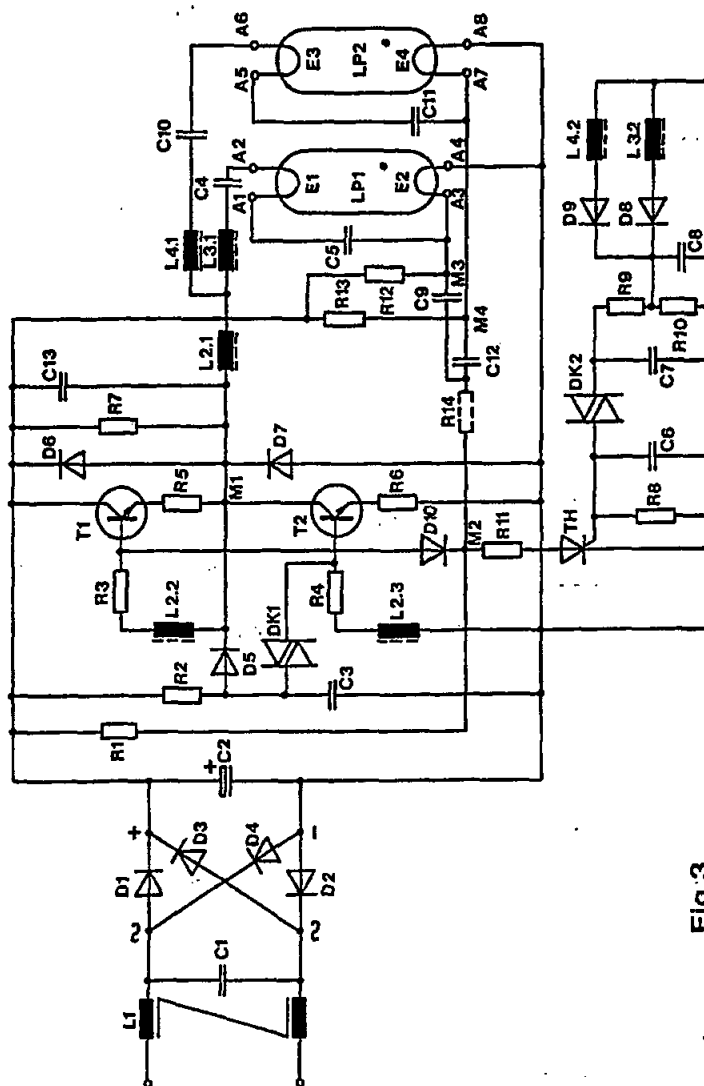


Fig.3

4,710,682

1

FLUORESCENT LAMP OPERATING CIRCUIT

Reference to related literature:

U.S. Pat. No. 4,438,372, Zuchtriegel, assigned to the assignee of the present application, the disclosure of which is hereby incorporated by reference.

U.S. Pat. No. 4,481,460, the disclosure of which is hereby incorporated by reference.

"SIPMOS Transistors", SIEMENS Application Notes 1983, chapter 1.9, "Electronic ballast for fluorescent lamps", pp. 34 et seq., and equivalent general disclosure "Elektronischaltungen" ("Electronic Circuits") by Walter Hirschmann, published by SIEMENS AG, chapter B3.12, "Elektronisches Vorschaltgerät für neue Leuchtstofflampen" ("Electronic Ballast for New Fluorescent Lamps") 50 W/220 V, a-c, pp. 147 to 151.

The present invention relates to circuits to operate one or more low-pressure discharge lamps, typically fluorescent lamps and more particularly to an arrangement to permit automatic restarting of a lamp in an energized operating circuit after a lamp has been removed from the lamp socket, for example due to malfunction of the lamp.

BACKGROUND

The referenced U.S. Pat. No. 4,438,372, Zuchtriegel, assigned to the assignee of the present application, the disclosure of which is hereby incorporated by reference, describes a circuit to operate one or more fluorescent lamps at a frequency which is above network or power frequency. The received power frequency, at 50 or 60 Hz, depending on national standard, is rectified, and then converted to a much higher frequency. It has been found that fluorescent lamps operate more efficiently at frequencies substantially higher than network power frequency.

The circuit, as described in the referenced literature and patents, utilizes, hence, a power network rectifier to which a push-pull frequency of two alternately switching transistors is connected. A control circuit is provided to control the transistors for alternate switching. A center junction between the transistors forms one terminal of the supply circuit to the fluorescent lamp or lamps. Each one of the fluorescent lamps has a series resonance circuit associated therewith, which includes a resonance inductance, a coupling capacitor and a resonance capacitor. The supply lines for the fluorescent lamps are connected to a first electrode via the coupling capacitors and the resonance inductances to connect to the center junction between the two transistors. A further line from the second electrode of the lamps is connected to the negative terminal of the power network rectifier. To remove operating power from the lamps, for example if one of the lamps should burn out or is to be replaced, a turn-off circuit is provided which includes a diode in series with a resistor and a thyristor with a trigger circuit which connects the base of the transistor connected to the positive terminal of the power rectifier with the negative terminal of the power rectifier, through a resistor which, in turn, is connected to the positive terminal of the power rectifier and to the center junction between the diode and the other resistor. A reenergization circuit is likewise provided.

The basic circuit, without the turn-off and the reenergization circuit, is described in the Siemens literature, for example in the book "Elektronischaltungen" ("Elec-

2

tronic Circuits") by Walter Hirschmann, chapter B3.12, pp. 147-151, "Elektronisches Vorschaltgerät für neue Leuchtstofflampen" ("Electronic Ballast Circuit for New Fluorescent Lamps") 50 W/220 V. This detailed description is also reflected in the English-language literature without, however, all the theoretical considerations, see Siemens publication "SIPMOS Transistors, SIEMENS Application Notes 1983".

The connection of the fluorescent lamp or lamps can be placed, selectively, between the positive terminal of the power rectifier and the center junction between the serially connected switching transistors, or between the center junction of the two transistors and the negative terminal of the power rectifier. It has been found preferable to connect the fluorescent lamps in parallel with the center junction between the two transistors and the negative terminal of the power rectifier, as will be described in detail below.

U.S. Pat. No. 4,438,372, Zuchtriegel, assigned to the assignee of the present application, the disclosure of which is hereby incorporated by reference, describes a similar ballast or energizing circuit having a self-starting push-pull switching arrangement. The network circuit, including the push-pull switch, further includes a disconnect circuit, as described above. In case a lamp is defective, the push-pull switching circuit is disabled by firing of the thyristor. After the lamp, which may be a single lamp or one of a plurality of lamps, has been replaced, the push-pull circuit will not start on its own. It is necessary first to remove the holding or firing current from the thyristor, so that the thyristor can revert to blocking state. Consequently, if for example one lamp of a plurality of lamps has to be disconnected or replaced, it is necessary to first switch off the circuit for all the lamps in which it is used, before the circuit can be restarted, by starting the push-pull oscillator again to generate oscillations.

U.S. Pat. No. 4,481,460 describes an inverter with a disconnect circuit which is particularly designed for use with discharge lamps with heatable electrodes. A thyristor is used as a switching element for a disconnect or turn-off circuit connected in the heating circuit of the lamp. The thyristor connects the negative terminal of the power rectifier with the lamp heater circuit. The thyristor receives a holding current from the electrode closest to the charge capacitor. A disconnect winding of the saturation transformer is coupled in parallel with the thyristor via diodes and the starting capacitor is coupled in parallel with the thyristor via a resistor. In this disconnect circuit, it is not necessary to disconnect the alternating current power supply after exchange of a lamp in order to permit the inverter to start again. When a defective lamp is removed, the thyristor also loses its holding current, so that it will revert to blocking state.

THE INVENTION

It is an object to provide a circuit for use with a fluorescent lamp or fluorescent lamps as described, for example in the referenced Zuchtriegel U.S. Pat. No. 4,438,372, which provides for self-restarting of the circuit by immediately generating again oscillations by the oscillator. Consequently, the respective lamp or lamps will reignite rapidly and interruption of network supply power is not needed.

Briefly, a restarting circuit is provided, used with the circuit, for example as described in the referenced Zuchtriegel U.S. Pat. No. 4,438,372, which includes a

4,710,682

3

capacitor and a resistor. The capacitor is connected to the heater terminal of the electrode the other terminal of which is connected directly to the negative terminal of the power rectifier. The other terminal of the capacitor is connected to the center junction between the diode and the resistor of the turn-off circuit which includes the thyristor. The resistor of the restarting circuit is connected to the center junction between the capacitor and the heater terminal of the electrode and to the positive terminal of the power network rectifier.

The system has the advantage that by mere inversion of the polarity of charge being applied to the capacitor, the thyristor will change from conductive to blocked state since the holding or through-current through the thyristor will be removed, so that the frequency generator will, on its own, start oscillating again. Thus, automatic restarting of the circuit is insured.

DRAWINGS

FIG. 1 is a schematic general block circuit diagram of a basic fluorescent lamp circuit in which the circuit components and features in accordance with the present invention are shown in detail, the remainder of the circuit being generally illustrated in block diagram form only;

FIG. 2 is a detailed circuit diagram of the circuit of the present invention together with a supply circuit for one fluorescent lamp; and

FIG. 3 illustrates the circuit of the present invention for use with two fluorescent lamps connected in parallel.

DETAILED DESCRIPTION

Referring first to FIG. 1, which shows the general structure of the circuit to which the present invention relates, and the improvement of the present invention.

A harmonic filter 1 is connected to an alternating current power network, for example of 50 or 60 Hz, which, in turn, is connected to a rectifier 2. The output of the rectifier 2, that is, its positive and negative terminal, are connected to a push-pull frequency generator 3 forming an inverter circuit having a control circuit to control the frequency thereof. The frequency generator 3 has two switching transistors of the same type which bridge across the outputs of the rectifier. The emitter-collector paths of the switching transistors are connected to a common junction M1. A low-pressure discharge lamp, typically a fluorescent lamp, LP1, is connected between the common junction M1 between the transistors and the negative terminal of the power rectifier 2. A series resonance circuit 4 is connected in the circuit to the lamp LP1. To disconnect the lamp LP1, a safety interrupt, or disconnect circuit is provided formed by a diode D10, a resistor R11 and a thyristor TH, together with a trigger circuit 5. The series circuit of diode resistor and thyristor TH is connected to the base of the switching transistor which is connected to the positive terminal of the power rectifier 2. A second common junction M2 between the diode D10 and the resistor R11 is connected over a resistor R1 with the positive terminal of the power rectifier 2.

In accordance with a feature of the invention, a reconnect circuit is provided, formed by a capacitor C9 and a resistor R12. The capacitor C9 is connected to the junction M2 between the diode D10 and the resistor R11 and to the heater terminal of the electrode of the lamp, the other terminal of which is connected to the negative terminal of the power rectifier 2. The resistor

4

R12, connected to a third common junction M3 between the capacitor C9 and the electrode terminal of the lamp, is further connected to the positive terminal of the power rectifier 2. A further resistor R14 may be used, connected between the second terminal of the capacitor C9 and the junction M2, as shown in FIG. 1. Resistor R14 is shown in broken lines since it is not strictly necessary.

Operation: If there should be malfunction or removal of the lamp LP1, the trigger circuit 5 of the thyristor will cause the thyristor to become conductive. The trigger circuit itself is coupled by an inductance to the series inductance forming part of the circuit 4 and connected to the lamp LP1. Upon firing of thyristor TH, the base of the transistor connected to the positive terminal of the power rectifier will lose control power since, in effect, it will be connected to the negative terminal of the power rectifier or, in other words, will be effectively grounded. The transistor will block and oscillation of the push-pull frequency generator 3 will cease. The diode D10 in the anode circuit of the thyristor blocks alternating current; the resistor R11 is a current limiting resistor. Resistor R1 provides continued current to the anode of the thyristor so that, after becoming conductive, it does not revert to blocked condition.

Upon removal of the lamp LP1, or other lamps connected in parallel, as will appear, capacitor C9 will be charged over resistor R12. This occurs in a few seconds. Upon insertion of a new fluorescent lamp into the appropriate sockets, the positively charged surface of the capacitor C9 is connected via the electrode of the lamp LP1 to the negative terminal of the rectifier which causes discharge of the capacitor C9 and recharge in opposite direction by removal of holding current from the thyristor TH. The time constant for the thyristor to change state is determined by the time constant of the capacitor C9 and resistor R11, and is usually less than 0.1 millisecond. If it is desired to extend the recharging time, resistor R14 may be used; this somewhat increases the reliability of the transition of the thyristor TH into blocked condition.

The exact circuit diagram is shown in FIG. 2. The filter is formed by a choke L1 and a capacitor C1 in parallel to the input to the rectifier. The harmonic filter is connected to the rectifier formed by diodes D1 to D4. A smoothing capacitor C2 is connected in parallel to the output of the rectifier.

The frequency generator is a push-pull frequency circuit having the two transistors T1, T2, feedback diodes D6, D7, base resistors R3, R4, emitter-resistors R5, R6, and a starting generator having resistors R2, R7, a capacitor C3 and a diac DK1. A capacitor C13 controls the steepness of the flank. The control circuit includes an inductance, in the form of transformer coils, having primary windings L2.1 and secondary windings L2.2 and L2.3. The lamp LP1 has one terminal A2 of the electrode E1 connected to the junction M1 between the transistors T1, T2 and the terminal A4 of the other electrode A2 connected to the negative terminal of the power rectifier. This connection provides for safety and reliability in operation. Further, a series resonance circuit formed by resonance inductance L3.1, resonance capacitor C5 and coupling capacitor C4 is provided. The resonance inductance L3.1 and coupling capacitor C4 are connected between the primary winding L2.1 of the control transformer, and the terminal A2 of the electrode E1 of the lamp LP1. Capacitor C5, connected

4,710,682

5

to electrode terminals A1 and A3 of the electrodes E1 and E2, forms the series resonance capacitor in the preheating circuit of the lamp LP1.

The operation of such a circuit using a push-pull frequency generator and a series resonance circuit to start and operate a fluorescent lamp is well known and described, for example, in the literature reference "Electronic Circuits" by Walter Hirschmann, page 148, and need not be described in greater detail, as well as in U.S. Pat. No. 4,438,372, assigned to the assignee of the present application.

The circuit, additionally, includes a disconnect arrangement which is formed by a series circuit of a diode D10, a resistor R11 and a thyristor TH, together with a trigger circuit. The series circuit connects the base of the transistor T1, that is, the transistor connected to the positive terminal of the power rectifier, with the negative terminal of the power rectifier. The junction M2 between the diode D10 and resistor R11 is connected over a resistor R1 with the positive terminal of the power rectifier. The trigger circuit for the thyristor is formed by a secondary winding L3.2, a diac DK2, capacitors C6 to C8, as well as by resistors R8 to R10. The structure and function of such a trigger circuit is explained in the referenced U.S. Pat. No. 4,438,372, the disclosure of which is hereby incorporated by reference, and assigned to the assignee of the present application. It is known and is not part of the present invention.

In accordance with a feature of the invention, a reconnect circuit is provided formed by the capacitor C9 and the resistor R12. This circuit interrupts conduction of thyristor TH, and may also be termed a thyristor interrupt circuit. Capacitor C9 connects the center tap or junction M2 between the diode D10 and resistor R11 with the terminal A3 of the electrode E2. The resistor R12 provides for application of d-c voltage from the power rectifier to the junction M3 between the capacitor C9 and the electrode terminal A3.

The values of the various circuit elements to operate a 50 W fluorescent lamp are shown in the Table I, forming part of this specification.

Operation: Let it be assumed that the lamp LP1 fails, for example by loss of vacuum due to leaks, used emitter material, or the like. The resonance circuit 4 (FIG. 1), and specifically the element L3.1 (FIG. 2), will have an increase in voltage thereacross due to the free resonance. By transfer or transformer effect due to the secondary winding L3.2 in the trigger circuit, the diac DK2 will reach the breakdown voltage after a time determined by the RC value R9, C7, which causes the thyristor TH to fire. Upon firing, the base of the transistor T1 will lose control voltage by drainage to the negative terminal of the power rectifier through the now conductive thyristor TH. The push-pull oscillator will cease oscillating. The thyristor TH will receive holding current through the resistor R1 to hold it in conductive state.

Let it be assumed, then, that the defective fluorescent lamp is removed. The circuit, in accordance with the present invention, will then operate this way: Within a few seconds, capacitor C9 will be charged over resistor R12 to the d-c voltage output from the rectifier 2. After insertion of a new fluorescent lamp, the positively charged surface of the capacitor C9 is connected to the negative terminal through the electrode E2 of the now replaced fluorescent lamp. This causes discharge and recharge in opposite direction of the capacitor C9 by removal of the holding current from the thyristor TH so

6

that the thyristor TH, dependent on the time constant defined by the capacitor C9 and the resistor R11, will change to blocked condition. This time constant is usually less than 0.1 millisecond. Insertion of the resistor R14 increases this recharging time of the capacitor C9, and the reliability of transition of the thyristor TH into blocked condition.

Embodiment of FIG. 3: FIG. 3 shows the circuit of the present invention applied to a plurality of lamps, there two fluorescent lamps, connected in parallel. Essentially, the circuit is the same as that shown in FIG. 2, and only the additional features, which have been given additional reference numerals, will be described.

A second lamp LP2 is connected in parallel with lamp LP1. Lamp LP2 has electrodes E3, E4. An individual, that is, a second resonance series circuit formed by the resonance inductance L4.1 is provided, the series circuit further including coupling capacitor C10 and resonance capacitor C11. The series circuit formed by the coupling capacitor C10 and the inductance L4.1 is connected to the electrode terminal A6 of the lamp LP2, and to the primary control winding L2.1. The resonance capacitor C11 is connected between the heater terminals A5, A7 of the respective electrodes E3, E4 of lamp LP2. The connection A8 from the electrode E4 of lamp LP2 is connected directly to the negative terminal of the power rectifier.

The trigger circuit includes two secondary windings, that is, an additional secondary winding L4.2, serially connected with a diode D9. The circuit D9 - L4.2 is connected in parallel to the first secondary winding L3.2 and diode D8.

An individual reconnection circuit is provided for the further fluorescent lamp, here lamp LP2, formed by capacitor C12 and resistor R13. Capacitor C12 is connected between the junction M2 of the disconnect circuit and the terminal A7 of lamp LP2 in the preheater circuit thereof. Resistor R13 is connected to the positive terminal of the power rectifier. A junction M4, similar to junction M3, is formed between the capacitor C12 and resistor R13 and the heater or electrode terminal A7 of lamp LP2.

As can be seen, the circuit will cause the thyristor TH to unblock if a defective lamp—regardless of whether it is LP1 or LP2, or both—has caused first disconnection of oscillations by conduction of the thyristor TH and, after replacement of the defective lamp or lamps, restarting by blocking the thyristor TH, by withdrawing holding current therefrom due to the recharging of capacitor C9, or C12, or both in opposite direction.

More than two lamps may be operated from the push-pull power amplifier, each additional lamp being provided with its own series resonance circuit and its own restarting circuit, as described in connection with lamp LP2.

Various changes and modifications may be made within the scope of the inventive concept.

TABLE I

L1	choke: $U_D = 110$ V, $I_D = 270$ mA
C1	1.1 μ F, 250 V—
D1-D4	bridge-connected rectifier
	B 250, C 1000
C2	10 μ F, 450 V—
R1	100 k Ω , 2 W
R2	450 k Ω , 0.5 W
C3	0.1 μ F, 100 V—
D5	BY289
DK1	A9903
R3, R4	10 Ω , 0.5 W

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4,710,682

7

TABLE I-continued

R5, R6	1 Ω , 0.5 W
T1, T2	MJE 13007
D6, D7	BY291, 400 V
R7	390 k Ω , 0.5 W
C13	3.3 nF, 400 V~
L2.1	ring core 13 \times 7 \times 5 (N27) 3 windings 0.5 mm ϕ
L2.2, L2.3	1 winding 0.5 mm ϕ
L3.1	RM 12 A, 160 (N41) 75 windings/30 \times 0.1 0.9 mH 60 kHz
L3.2	3 windings, 0.2 mm ϕ
C4	0.33 μ F, 400 V~
C5	6.8 nF, 1500 V~
D10	1N4003
R11	120 Ω , wire resistor 1 W
TH	TIC P106 M
R8	1 k Ω , 0.3 W
C6	68 nF, 60 V~
DK2	A9903
C7	0.68 μ F, 60 V~
R9	470 k Ω , 0.3 W
R10	5 M Ω , 0.3 W
C8	150 pF, 100 V~
D8	1N4148
C9	47 nF, 400 V~
R12	2.2 M Ω , 0.5 W
R14	1 bis 10 k Ω

I claim:

1. Automatically restarting operating circuit for a low-pressure discharge lamp, such as a fluorescent lamp, for operation of the lamp with alternating current at a frequency high with respect to the frequency of a power network, having
 - a power rectifier (2) adapted for connection to the power network;
 - a push-pull inverter circuit (3), connected to the rectifier (2) and including
 - serially connected, alternately switching transistors (T1, T2) having a common junction (M1), and connected across the power rectifier (2), and
 - a control circuit for alternately controlling the transistors to conduct or block;
 - a series resonance circuit (4) associated with the low-pressure lamp (LP1, LP2) including
 - a resonance inductance (L3.1, L4.1), and
 - a coupling capacitor (C4, C10) and a resonance capacitor (C5, C11);
 - a connection network interconnecting the series resonance circuit and the low-pressure lamp including
 - a connection circuit connecting a first electrode (E1, E3) of the lamp to the coupling capacitor (C4, C10) and the resonance inductance (L3.1, L4.1) with the common junction (M1) of the switching transistors (T1, T2);
 - a second connection circuit connecting the second electrode (E2, E4) of the lamp with the negative terminal of the power rectifier (2); and
 - a safety interrupt circuit to remove the current from the electrode terminals of the lamp upon failure or removal of the lamp including
 - a series bypass circuit having a diode (D10) and a resistor (R11), said diode and resistor forming a second common junction (M2) and a main current path of a thyristor (TH) connected to the base of that one switching transistor (T1) which is connected to the positive terminal of the power rectifier (2), and the negative terminal of the power rectifier (2);
 - a trigger control circuit (5) for the thyristor (TH) and connected to the gate of the thyristor, and

8

- a holding circuit including a holding resistor (R1) coupled to the positive terminal of the power rectifier (2) and said second common junction (M2) between the control circuit resistor (R11) and the control circuit diode (D10),
- and comprising, in accordance with the invention, a circuit to interrupt conduction of the thyristor (TH) after firing thereof due to the removal of the holding current from the thyristor, including
- a thyristor, disconnect capacitor (C9, C12) and a disconnect resistor (R12, R13), said disconnect capacitor and resistor having a third common junction (M3);
- the thyristor disconnect capacitor (C9, C12) having a free terminal connected to said second common junction (M2) between the series circuit diode (D10) and series circuit resistor (R11) of the thyristor disconnect circuit;
- the disconnect resistor (R12, R13) having the free terminal connected to the positive terminal of the power rectifier (2);
- and said third common junction (M3) between the thyristor disconnect capacitor (C9, C12) and the thyristor disconnect resistor (R12, R13) being connected to one of the heater electrode terminals (A3, A7) of that one of the electrodes (E2, E4) of the lamp (LP1, LP2) which has its other terminal (A4, A8) directly connected to the negative terminal of the power rectifier (2),
- to discharge, and recharge in opposite direction of the thyristor disconnect capacitor (C9, C12) upon reinsertion of a lamp (LP1, LP2) in the circuit and thereby withdraw holding current from the disconnect thyristor (TH) and permit the alternating switching transistors (T1, T2) to resume oscillation.
2. The circuit of claim 1, further including a timing resistor (R14) connected between the free terminal of the thyristor disconnect capacitor (C9, C12) and the second common junction (M2).
3. The circuit of claim 1, wherein two lamps (LP1, LP2) are provided;
 - and each one of said lamps having associated therewith an individual circuit to interrupt conduction of the thyristor (TH), and each including a thyristor disconnect capacitor (C9, C12) and a thyristor disconnect resistor (R12, R13), connected together at an individual third common junction (M3, M4).
4. The circuit of claim 3, wherein said timing resistor (R14) is connected to both the free terminals of the thyristor disconnect capacitors (C9, C12) and is a common resistor for both said thyristor disconnect capacitors.
5. The circuit of claim 1, wherein a plurality of lamps (LP1, LP2) are provided, each having an individual series resonance circuit (4) associated therewith, and each having an individual circuit to interrupt conduction of the thyristor (TH) associated therewith, including an individual thyristor disconnect capacitor (C9, C12), an individual thyristor disconnect resistor (R12, R13), said disconnect capacitors and resistors being respectively, connected to individual common junctions (M3, M4).
6. The circuit of claim 5, further including a common timing resistor (R14) connected to the free terminals of said individual thyristor disconnect capacitors (C9, C12) and to said second common junction (M2).

JTX 223: DOCUMENT ENTITLED VALDARNO TRIP REPORT (ULT044578)

A11017 REMOVED DUE TO CONFIDENTIAL MATERIAL

**DTX 129: Japanese Patent Application No. JP 61-153997 Transistor Inverter, Filed
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明 明 書

1. 発明の名称

トランジスタインバータ

2. 特許請求の範囲

1. スイッチングトランジスタのコレクタ・エミッタ回路に流れる出力電流の一部をトランスにより取出して該トランスの二次巻線からベースに導き出せると共に、この二次巻線に流れる電圧が所定の周波数を有するときに導通する補助トランジスタにより前記ベース電流を導通してスイッチングトランジスタの少数キャリアの増強を行なうことにより該スイッチングトランジスタをターンオフさせるようにしたトランジスタインバータにおいて、前記スイッチングトランジスタのベース電流をとり出すための前記トランス二次巻線の巻数を、前記補助トランジスタによって電圧を取出すための二次巻線の巻数よりも少なくしたことを特徴とするトランジスタインバータ。

2. 前記トランジスタの二次巻線がセンタータップを有し、二次巻線の両端間の電圧が補助トランジスタにより取出され、前記スイッチングトランジスタのベース電流が前記センタータップからとり出されている特許請求の範囲第1項に記載のトランジスタインバータ。

3. 発明の詳細な説明

【発明の利用分野】

本発明はトランジスタインバータに関し、特に蛍光灯などの放電灯点灯回路に用いるシリーズインバータに好適なトランス構造による自動式トランジスタインバータに関する。

【従来の技術とその問題点】

蛍光灯などの放電灯の点灯回路に、一般のパワースイッチングトランジスタをシングルエンドッドプッシュプル回路にして所謂ハーフブリック方式にしたシリーズインバータを用いることがあるが、放電灯を負荷とする場合の問題点として、起動時には無負荷時と点灯中、電圧電流の波動、或いはランプ寿命変化等による負荷電流の波動が挙げられる。

すなわち、シリーズインバータにおいては、ス

特開昭61-153997(2)

スイッチングトランススタのコレクタ・エミッタ回路に流れる出力電流、つまり負荷電流の一部を、負荷に直列に接続されたトランス一次巻線によって検出し、該トランスの二次巻線からスイッチングトランススタのベースに導きこせることでベース電流を供給すると共に、この二次巻線の両端間に開ける導通電圧が予め設定した閾値を超えたときに導通するように補助トランススタを駆動し、この補助トランススタの導通によって前記スイッチングトランススタのベース電流を遮断してその少数キャリアの引き抜きを行なうことによりスイッチングトランススタをターンオフさせ、この動作を一定のスイッチングトランススタについて180°の位相差で交互に行なうことにより自動同期させることは周知の通りである。

ここで、スイッチングトランススタのコレクタ電流 I_C は負荷抵抗 R_L の値により大巾に変化し、例えば負荷として蛍光灯管放電回路を接続した場合、負荷抵抗 R_L の値は新しい正常にランプ2灯点灯で $R_L \approx 600\Omega \times 2$ ($I_C \approx 1.4A$)、

正常なランプ片点灯で $R_L \approx 600\Omega \times 3$ ($I_C \approx 0.8A$)、短負荷時(始動時)には R_L で $I_C \approx 5A$ 程度となる。また、本回路は蛍光灯管を負荷として説明しているが、負荷としてHIDランプなどを使用し、始動直後に負荷インピーダンスが低下するような場合、 $R_L = (200 \sim 300\Omega) \times 2$ で $I_C \approx 0.8A$ となる。

このコレクタ電流 I_C の変動は当然のことながらトランスの二次巻線の出力側に影響を与え、例えば正常なランプで適正な発光動作をするように回路を設計すると、負荷抵抗 R_L が300 Ω 程度に低下したときに補助トランススタを導通させるに充分な二次電圧がトランス二次巻線に生じなくなり、スイッチングトランススタのスイッチング動作に支障が生じる。

これに対して負荷抵抗が低くなる程度低くなり、片点灯した場合でもトランス二次巻線に充分な電圧を確保すべく二次巻線の巻数を増加するなどして二次巻出力を増大させると、スイッチングトランススタのベース電流を制御するためにそのベースに

直列に接続する抵抗の抵抗値を大きくしなければならず、従ってこのベース電流制御抵抗による電力損失が無視できなくなる。

【発明の目的】

従って本発明で課題とするところは、負荷電流の変動の広い範囲で安定に発光動作を行ない、且つ損失の小さい発光回路を有する前述の形式のトランススタインバータを提供することである。

【発明の構成と作用】

前述の課題は、本発明に従って、前記スイッチングトランススタのベース電流をとり出すための前記トランス二次巻線の巻数を、前記補助トランススタによって電圧を取出すための二次巻線の巻数よりも少なくすることで達成され、この場合、好ましい実施の形態によれば、前記二次巻線がセンタータップを有しており、二次巻線の両端間の電圧が補助トランススタにより検出され、前記スイッチングトランススタのベース電流が前記センタータップからとり出されるように構成されるものである。

本発明では、電源用トランスの二次巻線において補助トランススタの動作タイミング制御用の回路とスイッチングトランススタのベース電流供給回路とを例えば二次巻線にセンタータップを設けるなどして互いに独立させたので、補助トランススタの動作を負荷電流の減少に対して適宜にするような充分な二次巻線出力の確保と、スイッチングトランススタのベース電流の制御用抵抗による損失を低減させるための二次巻線からのベース電流のとり出し量の抑制とが同時に達成できるものである。

本発明の実施例を示せば以下の通りである。

【実施例】

第1図は2灯式蛍光灯管を負荷とするトランススタインバータ点灯回路に本発明を適用した場合の実施例を示しており、AC 200V電源からノイズ防止・効率改善回路1およびサーク収収回路2を介して入力された交流入力電圧を整流回路3により直流平滑出力に変換し、これをSEPPスイッチングトランススタQ1aとQ1bおよび補助トラン

特開昭61-153997(3)

トランスT1は昇圧用トランスであり、ひとつの一次巻線W1と二つの互いに逆巻きの二次巻線W2a、W2bとを有する。一次巻線W1は出力端子5に直列に挿入され、そこに流れる負荷電流を検出してそれに対応した互いに逆相の二次電圧を各二次巻線W2a、W2bに生ぜしめる。二次巻線W2a、W2bにはそれぞれ中間タップCPa、CPbが設けられており、CPaにはベース電流制限抵抗R1aを介してスイッチングトランジスタQ1aのベースが接続され、CPbには同様にベース電流制限抵抗R1bを介してスイッチングトランジスタQ1bのベースが接続されている。また二次巻線W2aの両端間には抵抗R2a、R3aおよびツェナーダイオードZD1aを介して補助トランジスタQ2aのベース・エミッタ回路が接続され、この補助トランジスタQ2aのコレクタはスイッチングトランジスタ

Q1aのベースに接続されている。同様に他方の二次巻線W2bの両端間には抵抗R2b、R3bおよびツェナーダイオードZD1bを介して補助トランジスタQ2bのベース・エミッタ回路が接続され、この補助トランジスタQ2bのコレクタはスイッチングトランジスタQ1bのベースに接続されている。尚、C3a、C3bは抵抗R3a、R3bと積分回路を形成するコンデンサである。

二つの蛍光灯ランプF1、F2は、それぞれチョークコイルCH1、CH2を介して出力端子5と整流回路3の整流出力端子との間に交流的に直列に接続されており、整流回路3のプラス側整流出力端子から抵抗R4、両ランプのフィラメント、抵抗R5、R6、R7およびコンデンサC1を順に経由して整流回路3のマイナス側整流出力端子に至る整流回路と、抵抗R6とR7との接続点Jから一方のスイッチングトランジスタQ1bのベースに直列接続された双方向サイリスタSSとで整流回路4により、このインバータの起動回路を形成している。尚、接続点Jとスイッチングトラ

ジスタQ1bのコレクタとの間に順方向接続されたダイオードD1は、インバータ起動時に、コンデンサC1の充電電圧を双方向サイリスタSSのブレイクオーバー電圧以下に保ち整流回路の動作を停止させ、インバータの誤動作を防止するためのものである。

起動回路に別途して、抵抗R5とR6との接続点とマイナス側整流出力ラインとの間に接続されているサイリスタSCRは、両ランプF1、F2のフィラメント回路に挿入された不平衡検出トランスT2の二次巻線巻線W1にランプ寿命などで両ランプに流れる電流の不平衡による電圧が生じたとき、所定値以上の不平衡電圧によってトリガされて抵抗R5とR6との接続点をマイナス側整流出力ラインに導くための異常停止用のものであり、このサイリスタSCRが導通したときはダイオードD2を介してトランス二次巻線W2bの両端間も整流され、また起動パルスも生じない。

さてこの実施例の点灯回路の動作について述べると、まずAC 200V電圧を投入して整流回路3

の整流出力端にその全波整流平均整流出力を生じると、抵抗R4、両ランプF1、F2の各片側のフィラメント、抵抗R5、R6、R7を介してコンデンサC1に電荷が蓄積しはじめ、接続点Jの電位が双方向サイリスタSSのブレイクダウン電圧を超えるとそれが導通して片側のスイッチングトランジスタQ1bにベース電圧を供給し、Q1bのコレクタにはダイオードD1を介して接続点Jから電流が供給されるので、Q1bが導通状態になり、インバータが起動されて発振を開始する。起動後は蛍光灯ランプF1、F2が放電可能状態に達していないので、出力端子5にはチョークCH1、CH2と各ランプの両フィラメント間に接続された始動用コンデンサC2a、C2bとの共振共振回路が接続されていることになり、この共振系のQが高いため共振電圧が例えば正常点灯時の1.4Aに対して5~11Aと大電圧となっている。次いで蛍光灯ランプF1、F2のヒータのウォーミングアップが終了して放電を開始すると、コンデンサC2aとC2bとがランプ放電パスによって実質的に両端

特開昭61-153997(4)

されるため、前述の共振がくずれて負荷電流が例えば 1.4A に安定し、正常な点灯状態となる。

この間、負荷電流の一部がトランス T1 によって増幅されていることは述べるまでもなく、スイッチングトランジスタ Q1a、Q1b はそれらの補助トランジスタ Q2a、Q2b が交互にオンオフすることにより共振を維持する。

トランス T1 の二次巻線 W2a と W2b とに生じる誘起電圧はその巻数に比例するが、図示の例では二次巻線の全巻数を有効に利用すべく二次巻線両端部の誘起電圧が補助トランジスタ Q2a、Q2b のベース駆分回路に印加されるようになっており、従って負荷電流が小さくなっても補助トランジスタ Q2a、Q2b のオンオフ動作が確実に行なえるように二次巻線の巻数を定めておけば、負荷電流の減少による共振の停止を抑えることができる。またこの場合、スイッチングトランジスタ Q1a、Q1b のベース電流を二次巻線の中間タップ CPa、CPb から供給するので、ベース電流制限抵抗 R1a、R1b を高抵抗とする必要がなく、従ってそれ

による電力損失も低減可能である。

ちなみにベース電流制限抵抗 R1a、R1b を中間タップではなしに、抵抗 R2a、R2b と同じ巻線端に接続した場合、ベース電流制限抵抗による電力損失は正常点灯時で片側 0.8W、計 1.2W であったが、本発明に従って R1a、R1b を中間タップ CPa、CPb に接続した場合は片側 0.105W、両側で 0.21W の電力損失となり、点灯中の電力損失の低減効果が確認された。

尚、補助トランジスタ Q2a、Q2b は、スイッチングトランジスタ Q1a、Q1b の少数キャリアを放りてターンオフさせるための駆動用のものであるから、スイッチングトランジスタのターンオフ動作を改善するために第 2 図に Q2a についてののみ示すようにコンデンサ Qx とダイオード Dx からなる駆分回路を付加して、Cx を介してスイッチングトランジスタの少数キャリアを吸引するようになってよい。

【発明の効果】

本発明は以上に述べた通りであり、所負の負荷

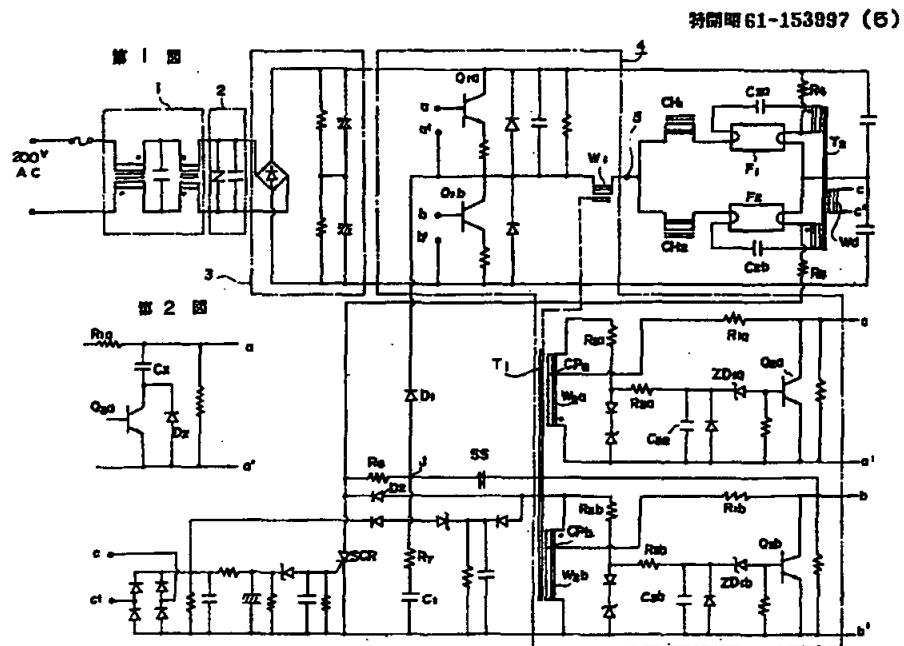
変動領域内での安定な共振の確保と、ベース電流制限抵抗の電力損失の低減とを同時に果たすことができるものである。

4. 図面の簡単な説明

第 1 図は本発明を蛍光灯用トランスタインバータ点灯回路に適用した場合の実施例を示す回路図、第 2 図はその変形例の部分回路図である。

3: 電流回路、4: シリーズインバータ回路、5: 出力端子、Q1a、Q1b: スwitchングトランジスタ、Q2a、Q2b: 補助トランジスタ、T1: トランス、W1: 一次巻線、W2a、W2b: 二次巻線、CPa、CPb: 中間タップ、R1a、R1b: ベース電流制限抵抗。

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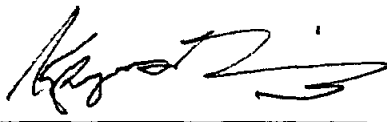
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Verification of Translation

I, Katsuhiko NAGASHIMA, declare that I am well familiar with the Japanese and English languages and am competent to translate patent specification from the Japanese language to the English language. I further declare, to the best of my abilities and belief, that the attached is a true and correct translation into the English language of the Japanese language text of patent specification.

I certify under penalty of perjury under the laws of the United States of America that the foregoing statements are true and correct.



Signature of Translator

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Specification

1. Name of Invention

Transistor Inverter

2. What is claimed is:

- (1) A transistor inverter designed to detect, by using a transformer, a part of an output current flowing through the collector-emitter circuit of switching transistors, to develop feedback of the current from secondary windings of such transformer to the base of the said transistors, and to turn off the said switching transistors, by using the auxiliary transistors through which current is conducted when the voltage developing in the secondary windings exceeds a specified threshold value; and, accordingly, the base current is cut off so as to extract minority carriers of the switching transistors, wherein the number of wirings of secondary windings of the aforementioned transformer for obtaining the base current of aforementioned switching transistors is made to be lower

than that of secondary wirings for detecting voltage of aforementioned auxiliary transistors.

- (2) The transistor inverter according to claim 1, wherein the secondary winding of aforementioned transistor has a center tap, the voltage between both ends of the secondary winding is detected by the auxiliary transistor, and wherein the base current of aforementioned switching transistor is supplied from aforementioned center tap.

3. Detailed Description of the Invention

[Application Field of the Invention]

This invention relates to a transistor inverter, and especially relates to a self-oscillating transistor inverter adopting transformer-feedback and being most suited for a series inverter used in a discharge lamp lighting circuit used for lamps such as fluorescent lamps.

[Background Art and Problems to Be Solved]

For discharge lamp lighting circuits used for lamps such as fluorescent lamps, series inverters adopting the so-called "half bridge method" are sometimes used, through constructing a single ended push-pull circuit from a pair of power switching transistors. The problems faced in using a discharge lamp as a load include: fluctuation in supply voltage upon start-up, when not loaded, or when lit; or fluctuation in load current due to aging of lamps.

In other words, as is well known, in a series inverter, an output current flowing through a collector-emitter circuit of a switching transistor, which is a part of a load current, is detected by a primary winding of the transformer, which is connected in series with the load, and then the feedback of the aforementioned is developed through a secondary winding of the relevant transformer to supply a base current. Also, the same may be achieved by arranging an auxiliary transistor so that a current is conducted when a feedback voltage developing between both ends of the secondary winding exceeds a specified threshold value; accordingly, with the conductance of a current through the auxiliary transistor, the base current of said switching transistor is cut off so as to extract minority carriers of the switching transistor to turn it off. A pair of the switching transistors conducts this operation alternately with a phase difference of 180° to achieve self-oscillation.

Here, a collector current I_c significantly changes in accordance with value of a load

resistor R_L . For example, when a fluorescent lamp discharge circuit is connected as the load, the value of R_L is: $R_L \approx 600 \text{ ohms} \times 2$ ($I_c \approx 1.4 \text{ A}$) when two new lamps are normally lit; $R_L \approx 600 \text{ ohms} \times 3$ ($I_c \approx 0.8 \text{ A}$) when one of the lamps is normally lit; and with no load (upon starting-up), when $R_L = \infty$, then $I_c \approx 5 \text{ A}$. Also, while a fluorescent lamp is explained as the load in this circuit, in a case where HID lamps, etc. are used as the load, and load impedance declines immediately after start-up, the value of R_L is $R_L = (200 \text{ to } 300 \text{ ohms}) \times 2$, then, $I_c \approx 0.8 \text{ A}$.

Naturally, such fluctuation in the collector current I_c affects the output value of a secondary winding of the transformer. For example, when designing the circuit to make appropriate oscillation with normal lamps, when the value of R_L declines to about 300 ohms, secondary voltage sufficient for conducting a current through the auxiliary transistor does not develop at the secondary winding of the transformer, which adversely affect the switching operation of the switching transistor.

On the other hand, if load resistance is lowered by a certain level and the output at the secondary side of the transformer is raised by increasing the number of winding of the secondary winding, etc., to ensure sufficient voltage at the secondary side of the transformer, even when only one lamp is lit, it is necessary to increase the resistance value of the resistor connected in series with the base of the switching transistor to limit its base current. Accordingly, power loss through this base current limiting resistor becomes significant.

[Object of the Invention]

Accordingly, the object of the present invention is to provide a transistor inverter of the aforementioned structure, which establishes stable oscillation over a wide range of load current fluctuations and has a drive circuit that incurs only small power losses.

[Structure of Invention and Operations]

According to this invention, the aforementioned disadvantages of conventional transistor inverters are resolved by making the number of windings of the aforementioned secondary winding of the transformer for obtaining the base current of the switching transistor lower than that of the secondary winding for detecting voltage by using the aforementioned auxiliary transistor. In the preferred embodiment, the aforementioned secondary winding has a center tap. It is structured so that the voltage between both ends of the secondary winding is detected by the auxiliary transistor, and the base current of aforementioned switching transistor is obtained from aforementioned center tap.

In this invention, at the secondary side of the feedback transformer, a circuit for controlling operation timing of the auxiliary transistor and a circuit for providing the base current of the switching transistor are separated from each other, in such a way as

to connect a center tap to the secondary winding. Accordingly, the transistor inverter according to the present invention will provide following advantages at a the same time: a) securing sufficient output at the secondary winding to ensure the stable operation of the auxiliary transistor against reduction in a load current; and b) restricting the volume of base current supplied from the secondary winding in order to decrease power losses developed with resistance for limiting the base current of the switching transistor.

An embodiment of the present invention is described below.

[Embodiment]

Fig. 1 shows an example in which this invention is applied to a transistor inverter lighting circuit using 2-lamp type fluorescent lamps as a load. An alternating current input from an AC 200V power source, through a noise-prevention/power-factor improvement circuit 1 and a surge absorption circuit 2, will be converted by a rectification current circuit 3 to a direct-current smoothing output, which in turn will be converted by a series inverter circuit 4, consisting of SEPP switching transistors Q1a and Q1b and auxiliary transistors Q2a and Q2b, to a high-frequency current, which will light up fluorescent lamps F1 and F2, connected to an output terminal 5.

Transformer T1 is for feedback, and has one primary winding W1 and two secondary windings W2a and W2b, which are wound in reverse directions with respect to one another. The primary winding W1, inserted in series to the output terminal 5, detects a load current flowing through the terminal, and generates secondary voltages that correspond to such a load current, and are reverse-phase with respect to one another, at each of secondary windings W2a and W2b. The secondary windings W2a and W2b have center taps CPa and CPb. CPa is connected to the base of the switching transistor Q1a, through the base current limiting resistor R1a, and similarly CPb is connected to the base of the switching transistor Q1b, through the base current limiting resistor R1b.

Also, between both ends of the secondary winding W2a, the base-emitter circuit of the auxiliary transistor Q2a is connected through resistors R2a and R3a, and through a zener diode ZD1a, and the collector of the auxiliary transistor Q2a is connected to the base of the switching transistor Q1a.

Similarly, between both ends of the secondary winding W2b, the base-emitter circuit of the auxiliary transistor Q2b is connected through resistors R2b and R3b, and through a zener diode ZD1b, and the collector of the auxiliary transistor Q2b is connected to the base of the switching transistor Q1b.

Meanwhile, C3a and C3b are capacitors that form an integration circuit with resistors R3a and R3b.

Each of the two fluorescent lamps F1 and F2 is connected, in parallel, conducting an

alternating current, between the output terminal 5 and the direct-current output terminal of the rectification current circuit 3, through choke coils CH1 and CH2. Each of the lamps forms a start-up circuit of this inverter consisting of: a) a series circuit constructed from the plus-side output terminal of the rectification circuit 3 to the minus-side direct current output terminal of the current circuit 3 through the resistor R4, the filaments of both lamps, the resistors R5, R6, and R7, and the capacitor C1; and b) a relaxation oscillation circuit constructed from the connection point J of the resistors R6 and R7 to a bidirectional thyristor SS, which is connected in series to the base of Q1B, one of the switching transistors.

Meanwhile, after starting the inverter up, a diode D1 being connected in the forward direction between the connection point J and the collector of the switching transistor Q1b keeps the charging voltage of the capacitor C1 at or below the breakover voltage, to stop operation of the starting-up circuit, and thereby prevents the inverter from malfunctioning.

In relation to the starting-up circuit, a thyristor SCR is connected between connecting points of the resistors R5 and R6 and a minus-side direct-current output line. The thyristor SCR is triggered by an imbalance in voltage at or above a specified value, when unbalanced voltage develops at the secondary detection winding Wd of the voltage imbalance transformer T2, which is inserted into the filament circuit of lamps F1 and F2, as the result of an imbalance between the currents running through the two lamps F1 and F2, due to aging of the lamps. When the thyristor SCR conducts a current, both ends of the transformer secondary winding W2b will be bypassed through a diode D2, and starting pulse will not develop, either.

The lighting circuit used in this embodiment functions as follows. Firstly, the circuit is powered on by an AC 200 V power supply to generate a full wave rectification smooth direct current at the edge of direct current output of rectifying circuit 3, and thereby electric charge starts to be built up in the capacitor C1, via the resistor R4, the filaments at one side of lamps F1 and F2, and the resistors R5, R6, and R7, and accordingly, when electric potential at the connection point J exceeds breakdown voltage of the bidirectional thyristor SS, SS conducts a current and the base current is provided to the switching transistor Q1b at one side, and as the collector of Q1b is provided with a current from the connection point J via the diode D1, Q1b conducts a current. Thereby, the inverter starts operation to initiate oscillation. As the fluorescent lamps F1 and F2 do not reach dischargeable stage immediately after starting up, the output terminal 5 is connected to a series resonant circuit comprising starter capacitors C2a and C2b, which are connected between chokes CH1 and Ch2 and filaments of the respective lamps. The high Q-factor of this resonance circuit causes a large load current, for example 5 to 11 A as opposed to 1.4 A in the case of normal lighting. Secondly, when the heater completes warming-up, the fluorescent lamps F1 and F2 start discharging, and thereby,

as capacitors C2a and C2b are essentially bypassed through the lamp discharge path, aforementioned resonance does not develop. Accordingly, the load current stabilizes at, for example, 1.4 A, and the lamps light normally. Meanwhile, it is needless to say that during such process, feedback of a part of the load current through transformer T1 develops, and the auxiliary transistors Q2a and Q2b operate turn-on and turn-off alternately to allow the switching transistors Q1a and Q1b to connect an oscillation.

Feedback voltage developing on the secondary windings W2a and W2b of transformer T1 exists in proportion to the number of winding coils. In the example shown in the attached figure, the structure allows feedback voltage between both ends of the secondary windings to be applied to the base integration circuits of the auxiliary transistors Q2a and Q2b, in order to effectively utilize total number of winding coils of the secondary windings. Therefore, even if the load current becomes smaller, once the number of coils of secondary windings is determined in order to ensure turn-on and turn-off operations of the auxiliary transistors Q2a and Q2b, it is possible to prevent an oscillation from stopping in a case in which the load current decreases. Also, in such a case, as the base current of the switching transistors Q1a and Q1b is provided from the center taps CPa and CPb of the secondary windings, it is not necessary for the base current limiting resistors R1a and R1b to have high resistance; accordingly, it is possible to reduce associated power loss therein.

Incidentally, in a case in which the base current limiting resistors R1a and R1b are connected without the center taps to the same ends of windings to which the resistors R2a and R2b are connected, the power loss by the base current limiting resistors at normal lighting is 0.6 W for one side and a total of 1.2 W for both sides. On the other hand, in a case in which R1a and R1b are connected to the center taps CPa and CPb in accordance with this invention, the power loss is 0.195 W for one side and total of 0.39 W for both sides. Thus, the effect of reduction in power loss during lighting is confirmed.

Furthermore, as the auxiliary transistors Q2a and Q2b are driving transistors that extract minority carriers from the switching transistors Q1a and Q1b to turn them off, it is also possible to improve turn-off operations of the switching transistors, by adding a differential circuit consisting of a capacitor Cx and a diode Dx (only with respect to Q2a as shown in Fig. 2), so that minority carriers of the switching transistor are extracted.

[Effect of this Invention]

As described in detail, this invention simultaneously enables the securing of a stable oscillation within the required range of load fluctuation and reduction in power loss in the base current limiting resistors.

4. Brief Description of the Drawings

Fig. 1 is a circuit diagram showing one embodiment of the present invention applied to a transistor inverter lighting circuit for fluorescent lamps, and Fig. 2 is a partial circuit diagram showing a variant embodiment of the present invention applied thereto.

3: Current circuit

4: Series inverter circuit

5: Output terminal

Q1a and Q1b: Switching transistors

Q2a and Q2b: Auxiliary transistors

T1: Transformer

W1: Primary winding

W2a and W2b: Secondary windings

CPa and CPb: Central taps

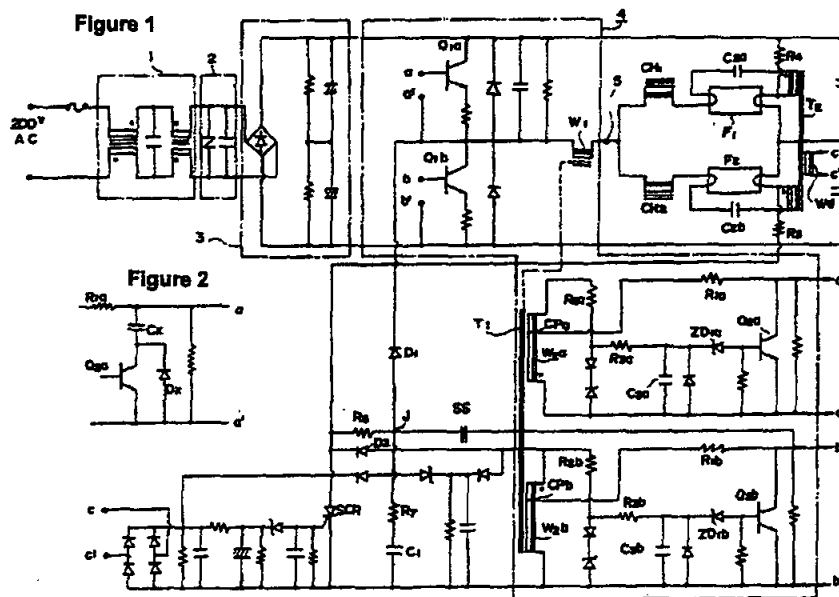
R1a and R1b: Base current limiting resistors

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Published Patent Application No.: JP 61-153997



DTX 328: Federal Register: Volume 76, Number 69 dated April 11, 2011; titled “Proposed Rules”. (ULT044467-ULT044556)

20106

Federal Register / Vol. 76, No. 69 / Monday, April 11, 2011 / Proposed Rules

b. Starting Method

~~On the preliminary TSD, DOE considered establishing separate product classes based on starting method. DOE found RS and PS ballasts to be inherently less efficient than IS ballasts because RS and PS ballasts provide filament power to the lamp. Although some PS ballasts cut out the filament power during normal operation (using the cathode cutout technology option discussed in chapter 3 of the NOPR TSD), the extra circuitry to remove this power still consumes some amount of power. Whereas RS and PS ballasts are commonly used as substitutes for instant start ballasts, they are not. Programmed start ballasts are commonly used in combination with occupancy sensors because of their ability to maintain the lifetime of the fluorescent lamp. The lifetime of a lamp operated on a PS ballast with occupancy sensors can be as much as three times longer than the lifetime of a lamp operated on an IS or RS ballast in the same application. Thus, DOE's research indicates that use of instant start ballasts with occupancy sensors can result in a significant reduction in lamp lifetime. Because the application in which they are used significantly affects lamp lifetime, programmed start ballasts offer the user a distinct utility. In consideration of their effect on BEF and utility, DOE established separate product classes for programmed start ballasts in the preliminary TSD.~~

Philips agreed that RS and PS ballasts would have lower BEFs than IS ballasts. Philips stated that cathode heating of RS and PS ballasts would make the lamps more efficient, which would increase ballast factor and therefore increase overall system efficacy, or BEF. The corresponding increase in ballast input power for these ballasts, however, would offset any overall gain in BEF. Despite this difference in BEF for RS and PS ballasts compared to IS ballasts, Philips did not think NEMA would object to the inclusion of rapid and instant start ballasts in the same product class. Whereas IS and RS ballasts offer the consumer similar utility, Philips believed PS ballasts offered consumers unique utility because of the application in which they are used. Regarding the impact of starting method on ballast efficiency, Philips pointed out that a metric of lamp arc power divided by ballast input power would consider power used to heat cathodes as losses. GE and Philips believed that this should be considered when defining product classes and setting standards. (GE, Public Meeting Transcript, No. 34 at p.

43; Philips, Public Meeting Transcript, No. 34 at pp. 44–46, 71–72)

DOE agrees with GE and Philips that cathode heating is counted as a loss in the BLE metric because it does not directly contribute to the creation of light. Thus, similar to BEF, RS and PS ballasts have lower BLEs than comparable IS ballasts. ~~Because starting method affects BLE in the same way it affects BEF, and DOE has already established a unique utility associated with PS ballasts, DOE proposes to maintain the current class divisions for starting method in this NOPR and establish separate product classes for programmed start ballasts and instant start ballasts.~~

c. Ballast Factor

Ballast factor (BF) is the ratio of light output of a reference lamp operated by a ballast to the light output of the same lamp operated by a reference ballast. It is typically used to adjust the lumen package of a lamp-and-ballast system. The ballasts proposed for coverage in this rulemaking are available with a variety of ballast factors. In the preliminary TSD, DOE classified a low BF as less than or equal to 0.78, a normal BF as greater than 0.78 but less than 1.1, and a high BF as greater than or equal to 1.1. In its previous analysis, DOE found that ballasts with high or low BF had lower BEFs than ballasts with a normal ballast factor. Because BF affected the lumen output of the lamp-and-ballast system, DOE observed that consumers tended to use ballasts with different ballast factors for different applications. DOE believed this behavior constituted a unique utility. Therefore, because of the impact on BEF and utility, DOE established separate product classes in the preliminary TSD for low, normal, and high ballast factor when these products existed for covered ballast types. In the preliminary TSD, however, DOE did not establish separate product classes for high, low, and normal BF for 4-foot T5 MiniBP HO, 8-foot HO, residential, or sign ballasts because products in this category were predominantly offered in one ballast factor range.

The California Utilities commented that DOE should divide residential ballasts into high, normal, and low BF categories because test results showed that residential products existed at more than one BF. (California Utilities, No. 30 at p. 5) Philips commented that the range considered for normal BF was unreasonably large. For T8 ballasts, industry typically considers normal BF to be from 0.85 to 1.00, whereas for T5 ballasts industry considers normal BF to

be about 1.00. (Philips, Public Meeting Transcript, No. 34 at p. 136–137)

Because DOE is evaluating a new metric for this NOPR, DOE analyzed the impact of ballast factor on BLE. During interviews, manufacturers stated that as ballast factor increases, BLE should also increase. This is the same observation as the one discussed in section 0, that BLE increases as overall lamp arc power increases, but on a smaller scale. As ballast factor increases, the ballast drives the lamp harder, which increases measured lamp arc power. Because the ballast operates at higher power, its fixed losses become proportionally less significant in comparison to lower BF's. Because BF affects the total power operated by a ballast, and DOE has established a relationship relating total lamp arc power to ballast efficiency, DOE believes the efficiency equation will account for any changes in BF. Thus, in this NOPR, DOE does not propose to establish separate product classes for high, low, or normal BF.

d. Lumen Package

Lumen package refers to the quantity of light that a lamp-and-ballast system provides to a consumer. To obtain a high lumen package, certain lamps are designed to operate with ballasts that run the lamps at high currents. For example, 8-foot HO lamps and 4-foot MiniBP HO lamps tend to operate at higher currents than 8-foot slimline lamps and 4-foot MiniBP SO lamps, respectively. This difference in operating design increases the quantity of light per unit of lamp length. High output lamps generally operate at higher wattages than comparable (same length, diameter) standard output lamps. In the preliminary TSD, DOE observed that this difference in lamp wattage caused ballasts that operate high output lamps to have lower BEFs than ballasts that operate comparable standard output lamps.

In addition, consumers tend to use systems with different lumen packages for different applications. For example, high-lumen-output systems may be installed in certain high-ceiling or outdoor applications where large quantities of light are needed. Alternatively, standard-lumen-output systems might be installed in lower-ceiling applications such as offices or hospitals, where the distance between the light source and the illuminated surface is not as large. Notable differences in the application of ballasts designed to operate SO lamps versus HO lamps indicate a difference in utility. Therefore, given the observed utility distinctions and notable efficiency differences, DOE established

UL T044484

PTX 001: Andrew Bobel's 1992 – 1993
Engineering Notebook (LBC001774 to LBC
001849)

A11602 – A11607 REMOVED DUE TO CONFIDENTIAL MATERIAL

**PTX 003: Excerpts from 1996-1997 Bryce
Hesterman Laboratory Notebook
(ULT039240-39253; Deposition Exhibit 97)**

A11665 REMOVED DUE TO CONFIDENTIAL MATERIAL

PTX019: NEMA LSD 21V1999 (R2002)
American National Standards Specifications
entitled ANSIVIEC C78.81V2005

LSD 21-1998 (R-2002)

End-of-life Operation of Small Diameter (5/8 inch Diameter or Less) Pin-based Fluorescent Lamps

Introduction

In almost all fluorescent lighting systems, variations in electrical and thermal parameters occur over time. In the present generation of large diameter fluorescent lamp-ballast systems, electrical and thermal variations can be tolerated due to the large diameter of the lamp.

However, with small diameter pin-based fluorescent lamps (both single-based and double-based with 5/8 inch diameter or less), there is less ability for the lamp and lampholder to tolerate electrical and thermal variations. Excessive electrical or thermal variation in small diameter fluorescent lamps can produce operational problems at the end of lamp life. One type of lamp failure is a broken or deactivated cathode. This can create an incorrect current operating condition producing high local heating that, if allowed to continue, may crack the lamp glass, or overheat the lamp base or lampholder.

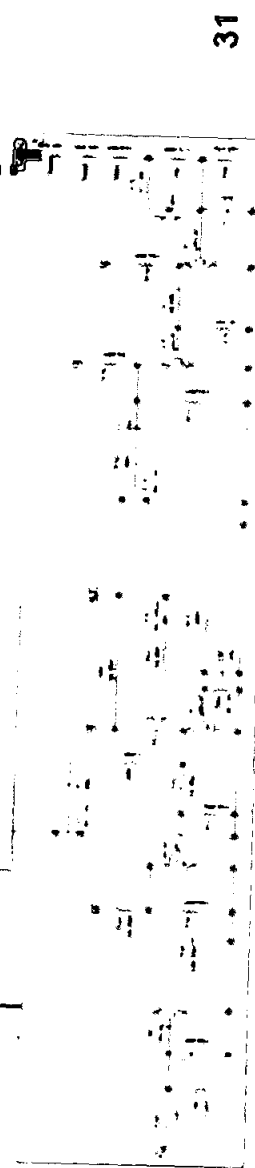
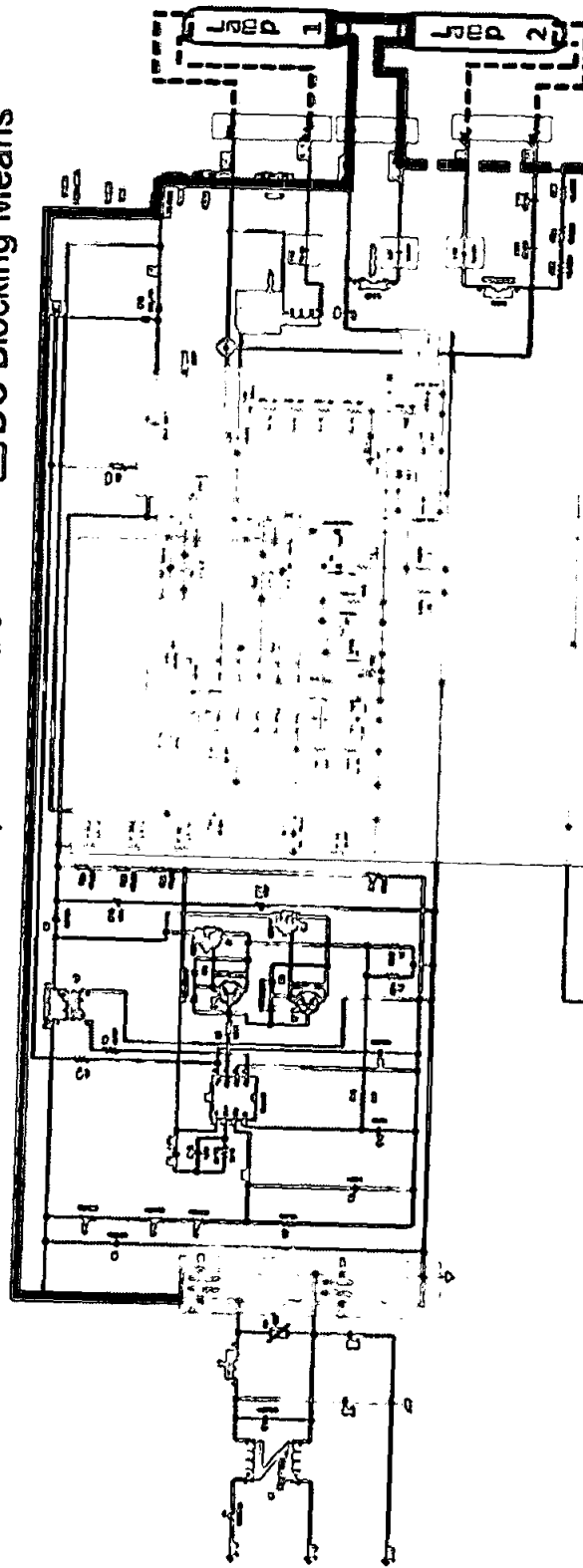
NEMA manufacturers are aware that in some situations an odor or emission may occur when the base, base cement within the lamp, or lampholder is overheated. In some situations, the plastic lamp base material or lampholder may deform. The plastics used by lamp and lampholder manufacturers are specifically chosen for their engineering properties so that combustion does not occur in such situations. NEMA manufacturers are not aware of any instances where combustion has resulted from this type of lamp failure. NEMA lamp and ballast manufacturers are working to resolve end-of-life performance issues and do not consider this type of lamp failure to represent a hazard.

PTX 58: Linear 1 Colored Schematic

EXAMPLE SCHEMATIC OF UNIVERSAL PRODUCT THAT INFRINGES (LINEAR-1)

Model Number: B254PUNV-D, Generation: D

- ☒ DC Control Signal (DCP)
- ☐ Rectifier/Input Terminals
- ☐ Resonant Converter
- ☐ Output Terminals
- ☐ Control Means
- ☐ DC Blocking Means



Intermediate Node

A11721

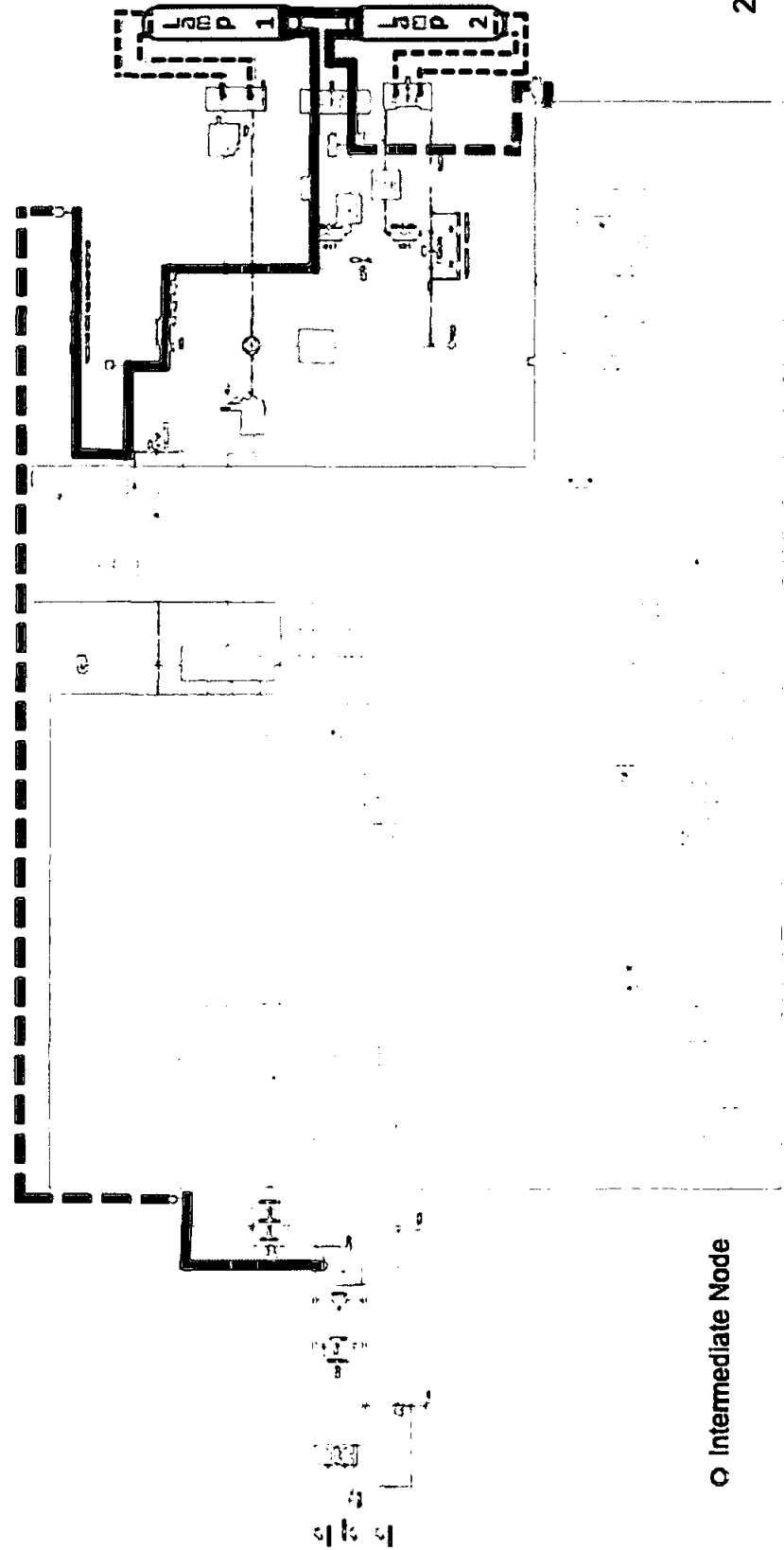
31

PTX 61: Linear 2 Colored Schematic

SCHEMATIC OF GROUP LINEAR-2 REPRESENTATIVE PRODUCT

Model Number: B224PUNV-C, Generation: A

- ☒ DC Control Signal (DCP)
- ☐ Rectifier/Input Terminals
- ☐ Resonant Converter
- ☐ Output Terminals
- ☐ Control Means
- ☐ DC Blocking Means



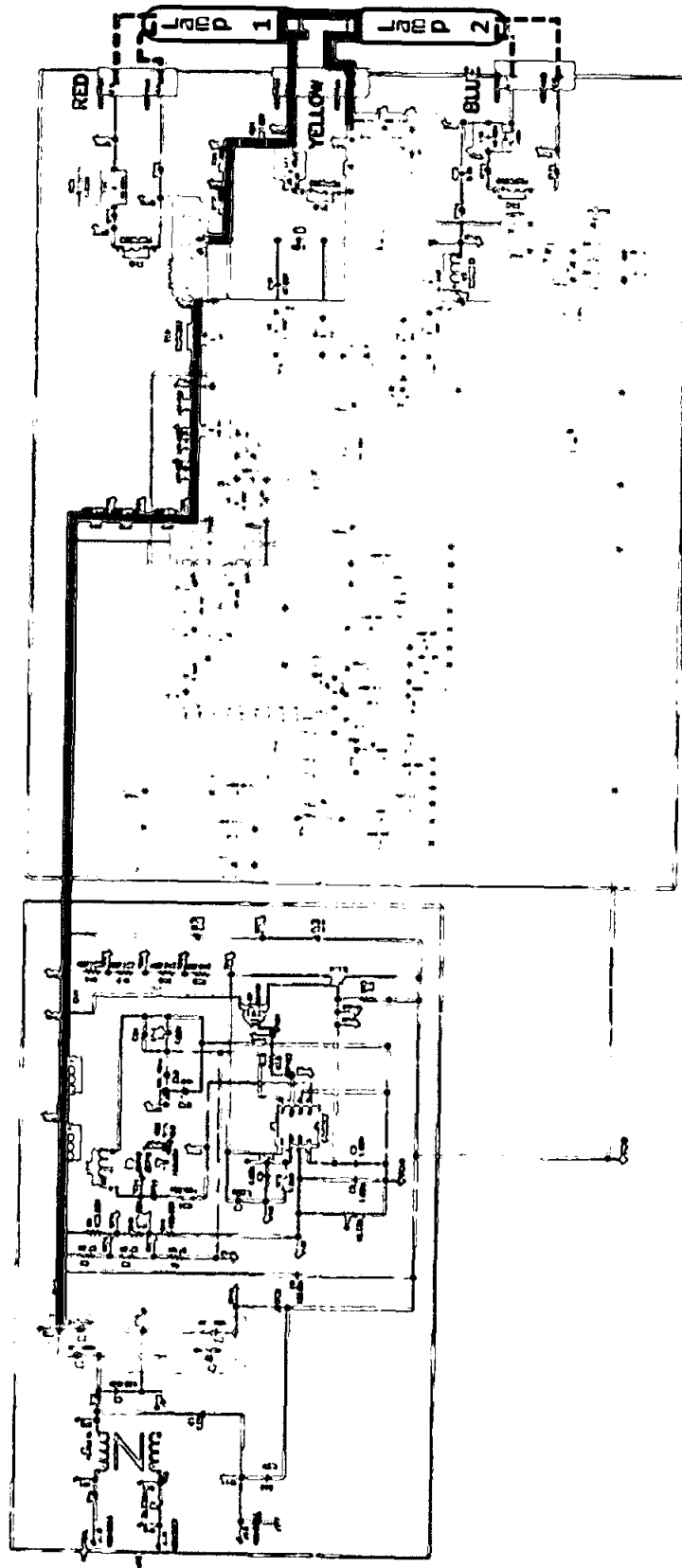
A11723

PTX 66: Linear Group 4 Colored Chart

SCHEMATIC OF GROUP LINEAR-4 REPRESENTATIVE PRODUCT

Model Number: B228PUNV115-D, Generation: C

- ☒ DC Control Signal (DCP)
- ☐ Resonant Converter
- ☐ Control Means
- ☐ Rectifier/Input Terminals
- ☐ Output Terminals
- ☐ DC Blocking Means



o Intermediate Node

A11725

PTX 78: Colored chart for ES Group

SCHEMATIC OF GROUP ES

REPRESENTATIVE PRODUCT

Model Number: ES4800A, Generation: A

- ☒ DC Control Signal (DCP)

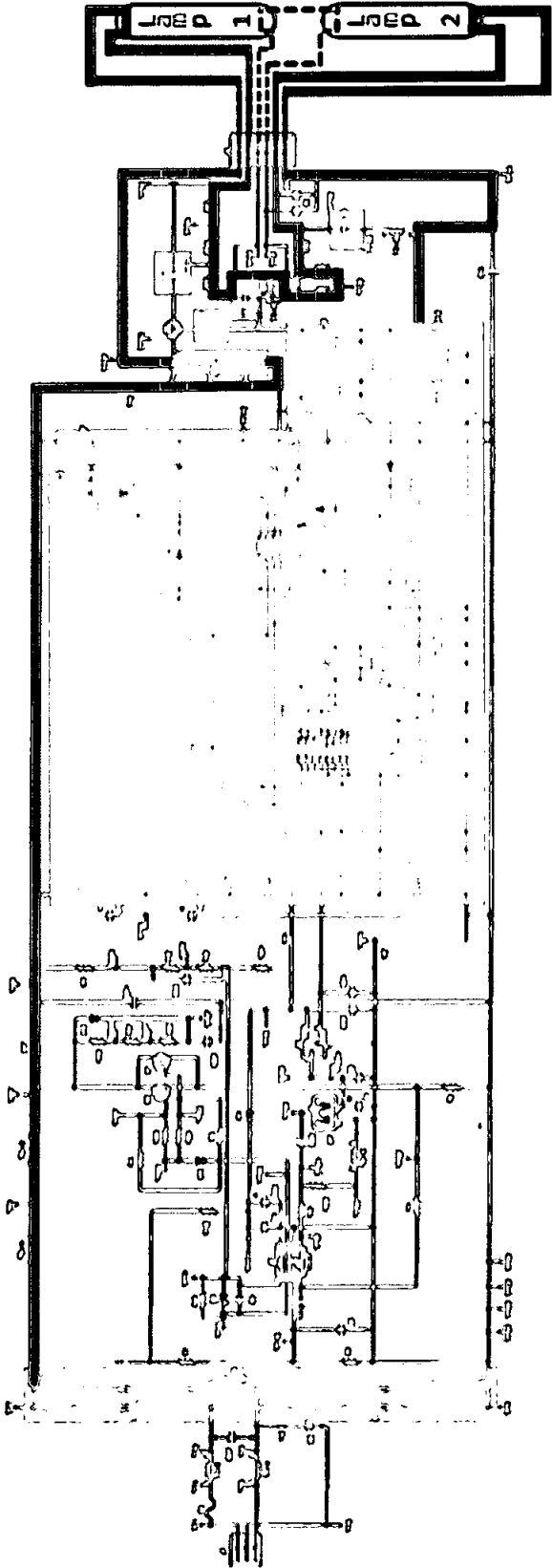
☐ Rectifier/Input Terminals

☐ Resonant Converter

☐ Output Terminals

☐ Control Means

☐ DC Blocking Means



Intermediate Node

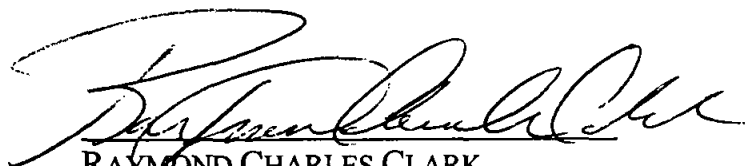
A11731

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on this 16th day of April, 2012, 2 copies of the foregoing NONCONFIDENTIAL JOINT APPENDIX were served by sending same via FEDERAL EXPRESS, PRIORITY OVERNIGHT postage prepaid, addressed to:

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A handwritten signature in black ink, appearing to read "Raymond Charles Clark", is written over a horizontal line.

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